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An Inquiry
INTO
THE NATURAL HISTORY OF SEPTIC WOUNDS.

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(*A Report in Three Sections to the Medical Research Committee.*)

SECTION III.[1]—TISSUE REACTIONS.

In the previous two sections of the present report I have attempted to collect certain facts relating to Sinuses and Sinus Formation and Vaccine Therapy, reserving the consideration of Tissue Reactions, both general and local, to the present and concluding section.

Many of the present observations are concerned with the phenomena of sinus formation, and in addition complement the conclusions reached after a critical survey of controlled vaccine therapy—namely, the utmost importance of the adoption of immunological methods as an essential and urgently necessary concomitant in the general principles of treatment of the wounds of war, not only as a palliative in the earlier febrile stages, but experimentally and clinically shown to be the intrinsic therapeutic and orderly complementation of the normal defensive processes whereby injured tissues re-establish their integrity and defeat the invasion of infecting micro-organisms.

Blood Examination in Septic Wounds.

In Table VII. I have collected the figures of the total and differential blood counts in certain cases of wound infection. The clinical type of case is indicated, and the day of disease upon which the examination was made is given. The majority of the patients were severely ill at the time the blood was examined. A case of acute streptococcal infection contracted by a nurse in attendance on septic wound cases and two cases of cerebro-spinal meningitis are included for comparison.

Acute gas gangrene.—Cases Nos. 1 to 9 and 37 were clinical gas gangrene. In Nos. 1, 3, 9, and 37 amputation was performed. No. 1 was a fatal case. The blood was taken immediately after amputation of the leg and shows very little departure from normal; a slight increase of leucocytes is noticeable; there were no changes in the red cells and no poikilocytosis. Case No. 2: Blood obtained on the day before amputation; blebs were present on the skin and contained B. perfringens; the leucocyte count is practically normal. In Cases Nos. 4 and 6 secondary hæmorrhage had occurred, which complicates the blood enumeration from the point of view of gas gangrene. Case No. 6 had a very extensive flesh wound; the red cell count was abnormally low in this case as well as in Case No. 5, but the leucocyte count was high. The differential count shows polymorphonuclear leucocytosis. Case No. 9, a severe compound fracture necessitating amputation followed by chronic tetanus, showed considerable leucocytosis, mainly polymorphonuclear; the amputation was performed on the tenth day and the blood count was made five days later. In all 10 cases, B. malignant œdema, B. perfringens, streptococci, staphylococci and members of the coli group were isolated; in Nos. 1, 2, 4, and 10 B. perfringens in enormous numbers was found in the infected tissue.

Severe septic wounds.—Cases Nos. 10, 11, 12, 13, 15, 16, 18, 19, 20, 28, and 34 were without clinical *gas* gangrene, but had gas bubbles in the pus together with B. malignant œdema, B. perfringens, B. Hibler, B. proteus, B. coli, streptococci and staphylococci. In case No. 18 the blood count, made after secondary hæmorrhage, showed a great diminution in the red cells count, definite leucocytosis, and a white cell ratio of 1:122. The differential count, taken in conjunction with the total white cell count, shows the increase to be general, with a slight increase in polymorphonuclears. In Cases Nos. 12 and 34 counts made on the fifty-sixth and twenty-fourth days respectively (both cases were still very ill) showed myelocytes in the blood; these were not seen in the other cases. The total increase in the white blood cells in the average septic wounds is below 20,000 per cubic millimetre.

Streptococcal septicæmia.—In Cases Nos. 17, 23, 27, and 34 streptococci were obtained from the blood during life. In Case No. 34 B. perfringens was also obtained. Of these four cases three died and one recovered (34). In Case No. 23 the polymorphonuclears were 89 per cent. In Case No. 34, which recovered, the differential count shows first a normal polymorphonuclear proportion, followed by an increase in their ratio as the case recovered. Perfringens and streptococci were isolated from the wound, but B. malignant œdema was not found.

Streptococcal infection, blood culture negative, wound positive.—Cases Nos. 14, 21, 23, 25, 30, 35, and 36. The blood enumeration was made somewhat late in Cases Nos. 14, 25, and 35. Case No. 14 gave an almost normal count with the exception that myelocytes formed 2 per cent. of the differential count. Case No. 30 was an industrial accident, a crush of the upper part of the thigh with extensive skin necrosis and foul odour. B. perfringens was found in the undermined skin and subcutaneous tissue. Case No. 24, prolonged sepsis commencing with paratyphoid fever and later running on to perineal abscess. The blood count in this case gave the lowest of any of the cases examined. Case No. 33, an instance of streptococcal infection occurring in a nurse, shows the diminution in the hæmoglobin from 90–50 in the course of nine days, with a sharp fall and then a slow rise of the leucocyte ratio. The differential counts give a marked increase of polymorphonuclear cells.

Other Cases.—Nos. 31 and 32 are blood examinations and differential counts in acute and convalescent cerebro-spinal meningitis. Case No. 29 was a proteus infection in which B. proteus was obtained both from the knee-joint wound and the urine. This case shows a low polymorphonuclear count and an increase of leucocytes; the other case showing a low differential count being Case No. 11, a case of gas gangrene without constitutional disturbance.

Emery suggests that the leucocyte count in cases of malignant œdema may be 40,000 or more. In only one case in my series, Case No. 5, was the leucocyte count above 40,000; in this case practically all the cells were polymorphonuclears. The case recovered. In Case No. 2 the blood was taken during the acute stage of infection, but the leucocyte count was not above normal. Case No. 1, a fatal case, blood taken at amputation of thigh, the total leucocytes had only reached 12,000. It is only in the recovered case or during recovery that the full leucocytosis is established.

It seems from a survey of Table VII. that some information is to be obtained from the total and differential blood counts in differentiating gas gangrene and streptococcal septicæmia. Early leucocytosis with a considerable increase of the polymorphonuclear cells is suggestive of the streptococcal infection rather than of commencing malignant œdema, and in view of the histological findings it is probable that the leucocytosis occurring in the later stages of gas gangrene and during recovery is related to the secondary coccal infections of the wound rather than to B. perfringens, &c. The degree of anæmia is more pronounced as far as the hæmoglobin is concerned, and a sharp fall in hæmoglobin, with an increase in polymorphonuclear cells in the differential count, points to coccal, perhaps streptococcal, infection. The presence of myelocytes and other signs of tissue irritation occur in late stages of wound infection.

Emery also states that a *left deviation* of Arneth's count is observed in cases of gas gangrene. In Table VIII. are given eight cases of Arneth's count in acute sepsis. The case numbers given in Table VIII. correspond to Table VII. It will be seen that the left deviation is pronounced in certain cases, more especially in Cases Nos. 12, 14, and 27. In these three cases prolonged sepsis had occurred, and in No. 27 the condition of the patient was desperate. A case of cerebro-spinal meningitis is appended for comparison.

On staining by Giemsa's method or Pappenheim's panoptic method (a combination of Jenner and Giemsa) in blood from cases of severe wound infection, a large number of polymorpho-

[1] Sections I. and II. were published in THE LANCET of July 15th (p. 89) and Sept. 30th (p. 585), 1916, respectively.

TABLE VII.

No.	Nature of wound.	Clinical notes of case.	Vaccine.	Day of disease.	Result.	Blood examination.*									Abnormal cells.						
						Hb.	Red cells.	White cells.	Ratio.	C.I.	Differential count.				Mast cells.	Myelocytes.	Normoblasts.	Poikilocytes.	Vacuolated cells	Polychromasia.	
											Poly.	Lym.	Mon.	Eos.							
						100	*5,000,000*	*10,000*	*500*	*1·0*	*67·0*	*23·0*	*6·0*	*3·0*							
1	Flesh w. both legs, R. arm.	G.S.W. shrapnel.	...	5	Died.	...	4,560,000	12,057	380	...	72·5	15·0	9·0	1·0	0·0	2·5	—	—	—	—	
2	Rifle grenade, C.C.F. R. foot.	Acute gas gangrene foot 20th day. Amputation.	V.	20	Recovered.	...	5,280,000	7,483	744	...	...	...	...	...	...	...	...	...	...	...	
3	Shrapnel w., C.C.F. foot.	Amp. lower 1/3 thigh, gas gangrene 3rd day.	V.	17	,,	55	4,144,000	12,841	345	0·7	...	...	...	...	...	...	...	...	...	...	
4	G.S.W. R. shoulder and hand; shattered humerus and scapula.	Secondary hæmorrhage 10th day.	...	15	,,	...	3,056,000	14,987	285	...	...	...	...	...	...	...	...	...	...	...	
5	G.S.W., C.C.F. R. arm at shoulder.	Gas gangrene early, remained local.	...	15	,,	...	3,248,000	45,476	72	...	...	...	...	...	...	...	—	—	+	—	
				38		...	4,224,000	13,929	324	...	43·0	45·0	7·5	0·5	1·0	0·0	—	—	+	+	
6	G.S.W., M.B.I. back, L. thigh, M. tissue injury.	Very extensive flesh wound, whole of back of thigh split from buttock to knee; gangrene.	...	13	,,	...	1,768,000	21,203	84	...	92·0	6·0	2·0	0·0	0·0	0·0	—	+	+	+	
				27		30	1,456,000	13,927	300	1·0	59·0	34·0	6·0	1·0	0·0	0·0	—	—	+	+	
				38		...	3,600,000	14,343	257	...	64·5	25·0	7·0	0·0	0·5	3·0	—	+	+	+	
7	G.S.W. thigh, C.C.F.	Operation followed by acute erysipelas and local gas gangrene three months after wound.	...	172	,,	40	3,212,000	21,011	153	0·6	75·0	12·0	6·0	1·5	0·0	0·0	—	—	+	+	
			...	179		...	...	...	...	...	80·0	13·0	5·5	0·5	0·0	0·0	—	—	+	+	
8	G.S.W. R. foot and arm.	Localised gas infiltration of tissues, no spread.	V.	5	,,	...	...	...	...	...	72·5	23·5	6·0	1·5	0·0	1·5	—	—	...	...	
9	C.C.F. ulna and radius.	Amp. humerus 10th day, chronic tetanus, stinking pus.	V.	15	,,	50	3,464,000	19,124	182	0·7	90·5	7·5	2·0	0·0	0·0	0·0	—	—	...	...	
10	C.C.F. humerus.	Severe damage to soft tissues, much fever.	V.	25	,,	40	2,716,000	14,189	194	0·9	76·5	19·0	4·0	0·5	0·0	0·0	—	—	...	...	
				30		...	2,904,000	14,759	207	...	...	...	...	...	...	...	—	—	...	...	
				80		60	4,872,000	13,306	374	0·6	...	...	...	...	...	...	—	—	...	...	
11	C.C.F. L. humerus.	Very septic and foul wound, no rise of temperature.	V.	31	,,	75	4,064,000	10,809	406	0·9	54·0	40·0	4·5	2·5	0·0	0·0	—	—	...	...	
12	G.S.W., C.C.F. R. femur.	Gas gangrene confined to leg area wounded.	...	56	,,	...	...	...	...	...	68·5	24·5	4·0	1·0	2·0	0·0	—	—	...	...	
		Secondary hæmorrhage 239th day.	...	63		42	2,000,000	20,252	1·0	0·9	...	...	...	...	...	...	...	...	...	...	
			...	123		65	...	...	...	...	75·5	14·0	9·0	1·0	0·5	0·0	+	+	++	+	
			...	249		54	...	...	...	...	64·5	21·5	15·0	0·5	0·0	0·5	—	+	...	+	
13	G.S.W. L. forearm.	In torpedoed hospital ship, 20 m. in water.	V.	5	,,	73	5,836,000	14,133	417	0·6	65·5	23·0	10·0	1·0	0·5	0·0	—	—	...	...	
14	C.C.F. L. arm and L. femur.	Long, slow convalescence; moderate temperature till 140th day.	...	127	,,	74	3,360,000	17,046	197	0·9	64·0	28·0	4·0	1·0	1·5	2·0	—	—	+	—	
15	G.S.W., C.C.F. both tibia; shell.	Several secondary abscesses opened. Blood cultures negative. No sequestrum 1 year 3 months.	V.	69	,,	58	...	...	...	...	57·5	34·5	7·0	1·5	0·0	0·0	—	...	...	...	
			V.	80		60	4,992,000	16,838	282	0·6	67·5	26·0	5·5	0·5	0·5	0·0	—	+	...	...	
16	G.S.W. arm, thigh, and side, M.B.I.	Severe knee-joint infection.	...	102	,,	68	3,245,000	...	...	...	...	...	...	...	...	...	...	...	...	...	
17	G.S.W. thigh and ankle, M.B.I.	Blood culture, streptococci; developed mental symptoms.	...	61	Died.	50	2,600,000	13,927	200	0·9	76·5	14·0	8·5	0·5	0·0	0·5	—	+	...	+	
18	Amp. R. arm at shoulder.	Secondary hæmorrhage 8th day.	...	13	Recovered.	42	2,080,000	17,689	422	1·0	76·5	20·0	0·5	0·0	0·0	0·0	—	...	...	...	
				16		50	3,336,000	13,720	256	0·7	...	...	...	...	...	...	—	...	...	...	
19	Explosive L. thigh M.B.I.	Brown stinking pus, gas bubbles, no spread.	...	13	,,	...	3,136,000	17,877	174	...	...	...	...	...	...	...	...	...	...	...	
20	G.S.W., C.C.F. thigh.	Very severe anaerobic infection, and neck of femur fractured.	V.	65	,,	42	2,708,000	19,332	142	0·8	...	...	...	...	...	...	...	...	...	...	
				111		54	...	...	...	...	67·5	25·0	2·5	1·5	0·0	0·0	—	...	...	...	
21	C.C.F. L. tibia (kick horse).	Acute "flare" after operation, 64th day.	...	71	,,	82	4,608,000	14,343	329	0·9	77·0	15·5	7·0	0·0	0·5	0·0	—	...	...	...	
22	C.C.F. thigh and pelvis.	Stinking pus, B. aertrycke isolated. Table VI., v. 30.	V.	18	,,	...	3,680,000	14,136	264	...	88·0	2·5	8·5	0·0	0·5	0·0	...	...	...	...	
23	G.S.W. fract. radius R.	Streptococcal septicæmia.	...	50	Died.	...	...	...	...	...	89·0	7·0	2·5	0·0	0·0	0·0	...	...	...	...	
24	,, ,,	Paratyphoid "B." Perineal abscess opened. Blood taken 6 days after.	...	156	Recovered	...	952,000	3,118	317	...	...	...	...	...	...	...	...	...	...	...	
25	G.S.W. thigh.	Severe secondary hæmorrhage.	...	179	,,	...	4,496,000	9,364	499	...	65·0	27·5	10·5	1·5	0·0	0·0	...	...	...	...	
26	G.S.W. shoulder and left hip, N.B.I.	Extensive flesh wound buttock, gas bubbles in pus.	...	21	,,	...	4,024,000	15,798	268	...	...	...	...	...	...	...	...	...	...	...	
27	G.S.W. L. shoulder.	Streptococcal septicæmia.	...	47	...	...	4,240,000	13,096	326	...	...	...	...	...	...	...	...	...	...	...	
				70		50	4,200,000	16,006	262	0·6	78·5	27·5	2·5	0·0	0·0	5·0	...	...	...	...	
28	C.C.F. ankle.	Gas infiltration of leg, tetanus, secondary abscess thigh.	...	58	Recovered	60	4,320,000	8,450	540	0·7	75·0	19·0	4·0	2·0	0·0	0·0	—	+	+	...	
29	Septic W. knee-joint.	Bacilluria, hæmaturia, albuminuria.	V.	101	,,	...	4,320,000	10,601	432	...	50·5	35·5	9·5	1·5	0·0	0·0	...	...	...	...	
30	Leg crushed in works.	Munitions accident, perfringens infection.	...	12	,,	...	...	...	...	...	74·5	15·0	8·5	2·0	0·0	0·0	—	+	...	...	
31	Cerebro-spinal meningitis.	Meningococci in cerebro-spinal fluid.	...	34	...	98	3,416,000	13,096	262	1·4	66·5	17·5	9·0	1·0	1·0	5·0	...	...	...	...	
32	,,	,,	...	1	...	85	4,744,000	13,891	365	0·9	70·0	20·0	5·0	0·5	0·5	0·0	...	...	...	...	
33	Infected finger (nurse).	Streptococcal infection finger, 21 incisions in arm. Temperature down on 14th day, 3rd day delirium and unconscious at times.	V.	3	Recovered.	90	4,764,000	15,175	317	0·9	...	...	...	...	...	...	...	...	...	...	
				5		80	3,532,000	16,422	220	1·1	85·0	12·0	2·5	0·5	0·0	0·0	...	...	...	...	
				8		70	3,944,000	17,461	232	0·9	...	...	...	...	...	...	...	...	...	...	
				12		50	4,416,000	15,175	294	0·5	81·5	13·0	6·0	0·5	0·0	0·0	...	...	...	...	
34	C.C.F. humerus involving joint and scapula.	Severe and extensive flesh injury. B. perfringens isolated from blood, gangrene of wound.	V.	24	,,	50	2,528,000	16,630	158	1·0	67·5	26·5	8·5	0·0	2·5	0·0	...	++	...	...	
				53		58	3,280,000	12,880	273	0·9	75·5	21·0	1·0	2·5	0·0	0·5	...	...	...	...	
				73		72	4,400,000	14,927	293	0·8	...	...	...	...	...	...	...	...	...	...	
35	G.S.W. elbow, M.B.I.	Severe wound of arm, heart-block. Streptococcal infection.	V.	109	,,	70	...	...	...	...	64·5	20·0	17·0	0·0	0·5	1·0	...	...	...	...	
36	Motor accident, C.F. tibia, S.F. femur.	Knee-joint involved, prolonged sepsis.	...	181	...	...	3,008,000	15,591	200	...	70·5	16·5	10·5	0·5	0·0	0·0	...	...	...	...	
37	G.S.W. L. thigh, N.B.I.	Gas gangrene in France, opened up. Secondary abscess in thigh 8th day; 10th day recurrent gas gangrene. Amputation.	...	8	Recovered.	60	4,500,000	14,200	300	0·6	91·0	9·0	0·5	0·5	0·0	3·0	...	+	+	+	

* The italicised figures are the approximate figures for normal blood. † Basophiles were present in Case 13. +, Abnormal cell present. —, Abnormal cell not noted.

nuclear cells exhibit acidophile granulation; in addition, the cytoplastic network is unduly pronounced, irregularity in staining (polychromasia) of nuclei, and occasional cells with marked basophile staining may be found containing azure granules. In the more severe cases myelocytes, mainly

TABLE VIII.—*Acute Sepsis. Arneth's Count.*

	—	Basophiles.	Eosinophiles.	Myelocytes.	Juvenile.	Rod nucleate.	Segmented nucleate.	Lymphocytes.	Large mononuclear.
	Normal blood.	1·0	3·0	0·0	0·0	4·0	63·0	23·0	6·0
	Acute sepsis (Arneth).	0·0	0·0	1·0	12·0	49·0	25·0	9·0	4·0
1	Gas gangrene.	0·0	1·0	2·5	20·5	5·0	47·0	15·0	9·0
12	Acute sepsis.	2·5	0·5	0·5	17·5	20·5	25·5	18·0	10·0
20	,,	2·5	1·5	2·0	3·0	16·0	48·5	25·0	2·5
35	,,	1·0	0·0	1·0	4·0	15·0	45·5	20 0	17·0
36	,,	4·0	1·5	0·0	3·5	5·0	57·5	22·5	6·5
,,	,,	0·0	0·5	2·0	2·5	7·0	61·0	16·5	10·5
14	,,	0·0	4·0	0·0	23·0	14·5	26·5	23·0	9·0
25	,,	0·0	1·5	4·0	3·5	5·0	57·5	27·5	6·5
27	,,	0·0	0·0	5·0	27·5	1·0	46·0	27·5	2·5
	Cerebro-spinal meningitis.	1·0	1·5	5·0	12·0	4·5	50·0	17·5	9·0

basophilic, are to be found, but the general appearance of the polymorphonuclear cells is the most striking, suggesting considerable cell degeneration; probably, notwithstanding the high total of the leucocyte count, a number of the polymorphonuclear cells in the circulating blood are aberrant, and it is questionable if their phagocytic activities remain normal.

HISTOLOGICAL EXAMINATION OF SEPTIC WOUNDS.

During the course of the investigations attention was frequently directed towards the tissue reactions occurring in the wounds, partly by clinical phenomena and partly by observation during surgical operations. Some reference to these tissue reactions has been made from time to time in the preceding sections, and I now propose to detail the more important observed facts which have a direct bearing on the after-history of a wound. It is not possible at the present moment to give a complete survey of the tissue changes taking place in all classes of wounds; time has not allowed examination of all the available material, and consideration of many of the interesting side issues must be reserved until a later date. Certain general facts, however, have come to light, and amongst them some having a practical bearing on clinical treatment. The tissue reactions may be divided into two main categories:—A. The local reactions in the wounded tissues engendered (1) by the impact of the missile, (2) by the bacterial flora developing within the wound. B. The general or systemic reactions produced as a result of changes in the wound itself, resulting in alteration in the blood and symptoms of disease in parts of the body remote from the wound.

I have already noted in passing, and it is essential to recapitulate briefly before proceeding to the description of the histological changes which have been met with, certain facts which mark off the wounds of war from the wounds met with in civil hospital practice and everyday civil life. Practically every gunshot wound, with the possible exception of simple in-and-out wounds of the flesh, show—(*a*) deep tissue laceration, together with what may be termed *molecular disturbance* and disintegration of the surrounding area; (*b*) anaerobe infection grafted on to a wound of irregular and radiating form. Some years ago Professor Boys used to exhibit in the course of certain popular lectures, photographs of bullets striking and passing through a pane of glass; the photographs showed curious waves caused by the disturbance of the air radiating from the point and butt of the bullet. Similar waves were seen radiating in all directions from the glass at the moment of impact, and after the bullet had passed through the glass, each particle of the splintered material flying off at various angles possessed a similar V-shaped wave. Now when a bullet strikes flesh or bone the enormous energy in foot pounds possessed by the bullet (*circa* 200 foot pounds at 200 yards range) must be absorbed by the tissue in the immediate vicinity, splinters of bone are driven off, each with their own degree of momentum, and the total energy possessed at the moment of impact by the bullet is thus distributed over a wide area, and each particle driven off the bone produces some degree of wound of the soft tissues. Such an illustration, though imperfect—the photographed waves of the bullet and fragments of glass are due to alteration in the density of the air—assists one to visualise the energy absorbed by the tissue when struck by a high-velocity projectile. Much more damage is caused than usually appears on mere inspection or even prolonged surgical examination of such wounds, and I believe that this generalised but microscopic tissue damage is one of the primary factors in the production of gas gangrene.

When a shrapnel ball or shell fragment is removed from a wound, more particularly from bone, a piece of clothing is frequently found driven into the tissue in advance of the metal fragment, and histological examination of wounds shows that, in addition to pieces of clothing, fragments of skin and surface epithelium are also driven in, and at times take root and become grafted on to the deeper tissues. Histological examination of sections of recent wounds frequently shows fragments of skin which have become adherent to the surrounding connective tissue; whether such grafts may eventually prove dangerous only the future can tell.

I have already pointed out in the section on Chronic Sinuses that I have succeeded in isolating anaerobic bacteria from a large series of sinus cases many months after the original wound was inflicted and in numerous cases in which the external wound had completely healed. There is little doubt that the disruption of the tissue radiating from the vicinity of the injury is in a great measure responsible for the persistence of anaerobe bacteria; their method of entrance requires little explanation, clothing and fragments of epithelium driven into the wound produce direct inoculation; thus, in a recent case of a simple in-and-out wound without bone injury mud from the trenches was present on the skin of the thigh near the entrance wound. The mud was scraped off (nearly a gramme was obtained), and from it both B. perfringens and B. malignant œdema were obtained on cultivation.

Chronic Anaerobic Infection.

Conditions for anaerobic development and persistence in a wound are ideal, and the following case is typical of such persistence.

Vaccine Case No. 19, Table VI. (Section II.), showed spore-forming organisms in the pus films, and B. malignant œdema and B. perfringens were isolated in pure cultivation. Five days after wounding portions of the broken muscular fibre, comminuted bone, radius and ulna, were excised at time of operation. A further examination of this case was made on the 232nd day; a small sinus was persistent which passed downwards to a cavity in the ulna. X ray photographa showed a small sequestrum lying in the centre of the cavity, surrounded by a great deal of loose callus. The sequestrum was removed and cultures made from it and fragments of the callus. B. malignant œdema and B. perfringens were recovered.

Histological Examination.

I. *Specimen from operation on fifth day.*—Bone, fibrous and connective tissue, and muscle were found inextricably mixed; here and there scattered throughout the tissue were areas of cell proliferation, in which a considerable number of cocci, staphylococci, and streptococci were seen; a few large bacilli were scattered amongst the cocci, but their numbers were small in comparison with the coccal infection. (Fig. 7.) This area of cell proiferation was mainly situated towards the free surface of the tissue and corresponded to the internal surface of the actual wound cavity. In the deeper layers of the mass cell reaction is nil; bundles of muscle fibres are observed, which have lost their striation. The connective tissue between the bundles is swollen, œdematous, stains badly, while long cracks and mechanical separation of muscle fibre and connective tissue are seen in all directions. The connective-tissue cells stain badly, and a number of greenish-yellow patches and stippling are partly fat globules and partly represent the remains of nuclei. Hæmatoxylin and eosin fail to show any living nuclei in these regions. A great difference is seen between the inner and the external parts in sections stained by Gram's method. In the depths a considerable number of Gram-positive bacilli and few cocci exist, in the outer layers few Gram-positive bacilli and many cocci are found. In the deeper layers, although the bacteria are mainly confined to the supporting tissue of the muscle bundles, some are seen lying in spaces in the muscular tissue itself, at times between

the individual muscle fibres. (Cp. Fig.) Some of the bacilli stain irregularly, with the curious granular appearance characteristic of B. perfringens, but in other areas bacilli with subterminal spores are seen in small groups. The organisms for the most part are arranged with their long axes parallel, and although the structure of the capillary walls is indistinct, the whole appearance suggests that the organisms have travelled along the capillary channels. In some situations the muscular tissue is entirely disintegrated and large masses of bacteria are found, but these areas are few in number, especially when compared with sections presently described, obtained from cases of acute gas gangrene.

It will be seen from the foregoing that both bacteriological and histological examination demonstrated the tissue infection with organisms of two classes, *aerobes* more or less confined to the superficial areas, *anaerobes* mainly present in the depths. The tissue damage evidently contributed in some measure to the bacterial distribution. The description of the section is typical of a large number of wounds investigated. One is struck in examining such cases with the paucity of tissue reaction to the anaerobe infection on the one hand and the tissue necrosis on the other, especially when compared with streptococcal or other usual types of infection.

II. *Specimen of callus and sequestrum removed at operation on 232nd day.*—The sections of the callus stained by hæmatoxylin and eosin showed much loose bony formation and areas of connective-tissue spaces filled throughout with proliferating cells; the nuclei throughout stained normally; in the bone Haversian canals are seen in active formation. Here and there spaces are found throughout the callus in which secondary degeneration has taken place; few nuclei are visible, but fibrous stroma is everywhere evident. The nuclei of portions of the adjacent tissue show vacuoles, are ill-defined; many have disappeared. The areas of secondary degeneration are small and do not make up any considerable proportion of the tissue; in some parts the newly-formed and irregular bone is apparently dead. The cellular elements immediately surrounding the structureless areas stain very deeply, owing to the presence of a mass of polygonal and multinucleated cells, the nuclei of which are in a state of active mitosis; polymorphonuclear cells are to be seen amongst them as well, some with cytoplasm staining brightly with the eosin.

Sections stained with Gram-Weigert.—The clear spaces noted in the hæmatoxylin- and eosin-stained specimens are found to contain bacteria. The islands of structureless bone, surrounded by inflammatory cells, contain numbers of streptococci in long curled chains, the cell proliferation passing right up to the edge of the streptococcal infection. The cells, especially the polymorphonuclears, are seen to contain numerous englobed organisms, mostly diplococci, but a few chains of streptococci are seen. The streptococcal infection is for the most part confined to the free borders of the tissue—namely, that forming the internal wall of the cavity. The sequestrum also showed active cell proliferation, with a similar mass of streptococci at the free borders of the tissue. The clear spaces noted in the hæmatoxylin-eosin specimens and in which the nuclei were unstained, contained a few Gram-positive bacilli; the numbers were small and no bacilli were observed in the tissue cells surrounding. No actual spores were seen, the actual number of Gram-positive anaerobes was small, a fact confirmed by the bacteriological examination; for although both B. malignant œdema and B. perfringens were recovered subsequently, three or four days elapsed before the bacilli appeared in the cultures.

The histological appearances observed in this sinus and sequestrum are illustrative of numerous similar cases examined. The chief emergent fact is the association of tissue regeneration and tissue degeneration in the same district of the wound, a circumstance closely related to the clinical course observed in many compound comminuted fractures. The anaerobic persistence, associated with minute areas of degeneration in the immediate vicinity of the organisms, to some extent explains the intractability of the "sinuses" and furnishes a clue to "flares" following sinus operations. These facts also support the procedure suggested by Captain C. W. Rowntree of using a tourniquet to facilitate the examination of deep sinus cavities and the removal of minute sequestra, each of which if left in the wound may act as a fresh focus of infection. Lazarus-Barlow,[1] in dealing with reaction to causes of inflammation, says: "But though it may be broadly stated that when the irritant is living the presence of numerous cells at the part is most obvious the statement is not entirely correct." He also further points out how frequently coincident destruction and repair may be observed in tissues infected with micro-organisms. However, although considerable controversy exists as to the source of the phagocytes which destroy the organisms in an infected area there is general consensus of opinion that phagocytosis is the ultimate process of destruction of the invading bacteria in wounded tissue, yet even after long intervals of time have elapsed from the date of wounding, patches of tissue without phagocytic reaction are invariably found, such tissue stains badly, is apparently undergoing digestion, and is usually found in the vicinity of Gram-positive anaerobic bacteria. On the other hand, on examining a number of sections of wound tissue, areas are found in which phagocytic activity is a prominent feature, and bacteria of the anaerobic variety may be seen engulfed by a number of the cells.

Sir Almroth Wright,[2] in his lecture before the Royal Society of Medicine, has shown that the B. perfringens is readily phagocytosed *in vitro* by polymorphonuclear leucocytes, and d'Este Emery,[3] in a modification and amplification of the method suggested by Sir Almroth Wright, gives some interesting details of the conditions determining phagocytosis of B. perfringens *in vitro;* he also suggests that a toxin is elaborated by the organism inducing negative chemiotaxis. On the other hand, a number of observers, amongst whom may be quoted Muriel Robertson[4] and Taylor,[6] have found considerable difficulty in obtaining a toxin from B. perfringens, while Dale and Barger[5] only found ammonia from cultures of B. malignant œdema. There is reason to suppose, as was suggested at the conclusion of Section I. of my report, that the *biological activity* of the anaerobes might be of more importance than their infectivity. B. perfringens readily produces acid from glucose, from inosite, and from other carbohydrates, and there is not a little evidence to suggest that the curious and rapid changes in muscular tissue in the neighbourhood of perfringens infection is related to the biological production of acid rather than to the liberation of true toxin. I shall recur to this point after discussing the histology of acute gas gangrene.

Acute Gas Gangrene.

The following case is illustrative of the type of acute gas gangrene met with during the inquiry.

The case was admitted on the fifth day with shrapnel wounds of both legs and left upper arm; a large piece of shrapnel was lying embedded in the left calf in close proximity to the upper end of the tibia; there was no bone injury. The radiograph suggested a large amount of gas in the region of the wound, apparently in the subcutaneous tissue and separating it from the muscles and fascia. The leg was amputated through the middle of the thigh. Subsequent dissection of the leg confirmed the diagnosis of gas infiltration; the whole of the subcutaneous tissue from just below the knee-joint to within three inches of the ankle-joint on the posterior surface of the leg, was separated from the muscular layer by the development of large quantities of gas; incision of the leg resulted in the escape of gas in considerable quantities. The muscular tissue was not deeply penetrated, but the surface of the gastrocnemius was undergoing surface digestion; in the immediate region of the wound there was no deep infiltration of the muscle visible to the naked eye. The subcutaneous tissue spaces formed by the gas pressure were occupied by areas of semi-fluid blood clot and hæmorrhagic exudation of recent origin; there was no smell. At the upper and lower extremities of the area of gas infiltration, penetration of the subcutaneous tissue by an irregular line of pus formation was found, extending along the intermuscular planes. There was no naked-eye appearance of gas in this region, and the tissues appeared normal in colour and were undigested, but on either side of the area of pus formation beyond the gas-affected parts the subcutaneous tissue, when incised, gave off a quantity of yellow fluid. This yellow fluid contained a number of globules, which on staining by Sudan III were found to be fat. The fluid itself was quite clear, free from cells on microscopic examination, and rapidly stained any linen or dressing material bright yellow. I have already noted this yellow staining as associated with B. malignant oedema. On the addition of a small amount of blood to a portion of the fluid, complete clotting occurred in about five minutes, but the fluid itself did not undergo spontaneous coagulation. The subcutaneous tissue from which this fluid exuded was much more yellow than the unaffected areas, and by making a longitudinal section of the skin and subcutaneous tissue throughout the length of the amputated limb, transition from gas infiltration through areas of pus formation, yellow and œdematous and finally normal subcutaneous tissue could be easily traced. Similar phenomena have been observed in all other cases in which immediate dissection of the amputated limb was performed.

Unfortunately, on the day subsequent to the amputation of the thigh, the wound in the left upper arm broke down with severe secondary hæmorrhage, necessitating ligature of the third part of the axillary artery. Within 15 hours of the ligature the internal surface of the upper arm had undergone degenerative changes; the muscles were soft and diffluent, particularly the biceps; the skin was dead and in ribbons, the fœtor extremely pronounced, and emphysema was found in the muscle. Amputation was accordingly performed and immediately upon amputation the arm was dissected. A similar condition to that observed in the leg was found; the area of gas infiltration and subcutaneous hæmorrhage was found to extend down the forearm to within two inches of the wrist-joint, but in this area there was no penetration of the muscular tissue. The subcutaneous tissue in the lower part of the upper arm and the upper part of the lower arm was œdematous and exuded yellow fluid which did not clot spontaneously but coagulated on the addition of a small amount of blood; no cells were seen in this fluid, but fat globules were found floating on the surface. The humeral biceps muscle was the one principally involved and was found more affected than the gastrocnemius. On separating the muscles the whole of the biceps was found infiltrated and emphysematous; a portion cut off floated in water and crepitated like a piece of lung. The other muscles of the upper arm were unaffected except superficially where they were in contact with the biceps. The deltoid was quite normal on its outer side and contracted sharply when incised.

In a previous section of the report I have drawn attention to the yellow staining found upon dressings under certain circumstances, and have pointed out that this curious yellow may be found occasionally in cultures on egg broth containing B. malignant œdema. The stain sometimes resembles that caused by iodine and was at first attributed to it, but the above description points to tissue disintegration as the source of this yellow-stained lymph, and its presence may be regarded clinically as a sign of progressive tissue destruction calling for careful surgical consideration. Some of the fluid was collected and further examined in the laboratory.

Slight coagulation occurred on boiling, but the coagulum formed was small and the whole fluid did not clot. The portion to which blood had been added after standing for 15 hours separated into loose clot and yellow clear fluid, similar to that obtained from the tissue.

Spectroscopically no absorption bands were seen, and the fluid which separated off from the clot did not contain hæmoglobin bands. On shaking with chloroform the yellow colour passed into the chloroform; this gave no spectroscopic information. On the addition of amyl-alcohol no extraction of colour took place, but general precipitation occurred. The precipitate gave Millon's reaction. On addition of dilute acid to the original fluid a white, somewhat sticky, precipitate formed, insoluble in alkali. Sodium hydrate produced no precipitate in the original fluid. The precipitation of this fluid by dilute acids will be referred to subsequently.

A bacteriological examination was made of the arm and leg; cultivations from every source, including the pus at the spreading edge of the gangrenous area, gave B. perfringens and B. malignant œdema in addition to streptococci and Gram-negative bacilli. B. malignant œdema and B. perfringens have been recovered from all the cases I have examined.

Microscopical examination of the muscular tissue attacked by acute gas gangrene gives an extraordinarily striking picture, especially when compared with that of a normal muscle or inflammation of muscle due to other forms of bacterial infection. The outstanding feature in acute gas gangrene, foreshadowed by the examination of chronic anaerobic infection, is the absence of cellular reaction. The actual form of the muscular tissue is not greatly altered at the commencement—that is to say, the muscle bundles remain in their supporting network and in transverse sections are abnormally definite but still show striation. The following description taken from the case of acute gas gangrene described above is typical of the histological findings in all the cases I have investigated.

Portions of the gastrocnemius near the wound and the humeral biceps were removed for histological examination. The portion of the biceps floated when placed in Müller's solution. The specimens were stained by hæmatoxylin and eosin and Gram-Weigert. Both transverse and longitudinal sections show muscle bundles widely separated from one another, the connective-tissue spaces between the main fasciculi are widely dilated, stretched, and in most instances only a small quantity of tissue débris is left which remains attached to the muscle bundle. (Fig. 8.) No cell nuclei are seen; some parts of the fibrous tissue contain granular masses and granules suggesting disintegrated nuclei; the striation of the muscle bundles has disappeared. The individual muscle fasciculi do not all stain to the same degree, and here and there, scattered throughout the section, spaces are seen representing the position of a muscle bundle which has undergone liquefaction. No individual cells can be made out, no leucocytes and no connective-tissue corpuscles are apparent. Under higher powers many of the muscle bundles are eroded, their edges irregular and diffluent, and here and there in the less affected muscles a faint trace of the original striation is observed; many are split into their ultimate fibres.

On examining the Gram-stained specimens with high magnification the whole of the interstitial spaces are found packed with a mass of Gram-positive organisms (Fig. 8), together with some smaller Gram-negative rods; no phagocytosis is seen. The organisms are not free, but are in the tissue spaces and clustered along the lines of the capillary vessels in the supporting tissue; in many instances the network of this tissue can only be traced by the arrangement of the bacteria. Very few organisms are to be found inside the muscle bundles, but this invasion takes place at a later stage, and here and there large spaces are seen in the interior of the muscle bundles containing bacilli resembling B. perfringens. In a few instances definite penetration of the muscular tissue is observed, organisms passing inwards from the disrupted edge of the muscle.

The picture is in certain particulars comparable with that of chronic gas gangrene already described, the infection and disruption of the tissue being only one of degree. Where the process has been in operation for rather longer, attempts at repair are found at the edges of the infection. The muscle tissues have lost most of their nuclei in the infected areas, but just outside this area the nuclei are deeply stained and can be traced around the muscle bundles. As the infected area is gradually approached the muscle bundles are found partially digested, staining is unequal, and some fragmentation has taken place, best seen where the muscle is cut longitudinally, proliferation of the connective-tissue corpuscles has commenced, and here and there the proliferation has progressed so far that whole tracts of muscle bundles have been replaced with round-cell infiltration of the usual type, suggesting that the partially dead muscle is being rapidly cleared away. Amongst the cells in the outer limit of the infiltration phagocytes are seen containing bacilli and other cells containing Gram-positive granules, evidently the semi-digested protoplasm of B. perfringens. The bacterial flora of this part consist mainly of cocci mixed with a few Gram-positive and a few Gram-negative bacilli. Clinically the gastrocnemius muscle was only slightly affected; the emphysema had not spread throughout the muscle from which the section was made. The appearance of the section suggests that commencing infiltration was in progress, but at the same time defensive tissue reaction was getting the upper hand in the area under examination.

Spore-forming organisms are not always found, but in some cases they are present in considerable numbers. Fig. 9 shows a portion of muscle from such a case; a crack, probably caused by gas pressure, is seen extending across the upper part of the field, and another commencing split is seen in which are a number of spore-forming organisms of the malignant œdema type. The granular stippled appearance is also well shown. In other portions of this section areas are seen occupied by organisms without spores and staining with the curious Gram-granular effect so often seen in B. perfringens. Fig. 10 is such a field obtained from the same case. Figs. 11 and 12 are from the extreme limits of the gangrenous process; Fig. 11 showing a small ruptured vessel the walls of which are outlined by the mass of Gram-positive bacilli adhering to them, a clear gas space exists between the vessel and the muscle tissue in which numerous phagocytic cells are seen packed full of Gram-positive bacilli; a good many free unphagocyted organisms are also seen in the intercellular spaces. The lower part of the photograph shows a tissue space probably due to gas splitting.

Fig. 12 is a photograph of the same area but under a lower power than Fig. 11. This section shows the relationship of the area of tissue reaction to the source of infection, a small vessel the wall of which has given way. The wall of the vessel is clearly outlined by a dark line which, on examination with a high power, is seen to consist of a mass of Gram-positive bacilli adhering to the vessel walls. The connective-tissue spaces are seen on the other side in the vicinity of the blood-vessel. These specimens are stained by Gram-Weigert. In the hæmatoxylin-eosin specimens the nuclei stain deeply, and many well-defined mitoses may be seen. A little below this part, not shown in the photograph, the tissue is undergoing coagulation necrosis, and the nuclear staining is indistinct. Attempted repair has therefore progressed to a certain point and has then ceased, some influence having destroyed the tissue vitality.

A small portion of subcutaneous tissue was removed from the extreme limits of the gangrene of this case. Pus

formation had commenced, and although no actual discharge or abscess cavity had formed the tissues were impregnated with milky purulent fluid which microscopically showed numerous phagocytic polymorphonuclear cells. The tissue in this region was 8 inches distant from the actual site of injury. A large amount of fibrous tissue was in course of formation; organisms, many of them partially digested, were found within the cells; the majority of these organisms were cocci. Bacilli were few in number.

Summary of the Pathological Histology of Gas Gangrene.

Throughout the greater part of the affected tissues the cells are dead, the nuclei have disappeared, and no trace of defensive tissue reaction is to be found. Scattered through the supporting fibrous and cellular tissue are enormous numbers of Gram-positive bacilli, mainly confined to this tissue but also invading the muscle bundles. The destruction of the tissues is so complete that it might be compared to the devastated and blackened country over which a prairie fire has passed, leaving but a few withered and shrivelled tree trunks in its wake. In the region of the actual wound where the primary infection commences, cocci and Gram-negative bacilli in addition to the anaerobic Gram-positive bacilli are found; the cell reaction is intense, and the destroyed tissues are in an active stage of repair by round-cell infiltration.

The mere occlusion of the circulation, either by thrombosis or by gas pressure, is hardly sufficient to determine the extraordinary disappearance of cell structure in a comparative short time—10 to 15 hours—and the phenomena point overwhelmingly to the generalised action of some rapidly diffusing protoplasmic poison.

In a recent communication Cuthbert Wallace[7] gives a very valuable description of gas gangrene as seen at the casualty clearing stations. He cites a case in which microscopical in addition to bacteriological examinations were carried out by Captain J. W. McNee, Captain E. Roberts, and Lieutenant Dunn. Sections of the affected muscles showed that the fibres had lost their transverse striation, the muscle substance was broken up in transverse plates or presented longitudinal markings as if painted with a coarse brush. Between the fibres, which were obviously separated from one another, were bacteria in varying quantities in the inter-fibrillar spaces. There were some polymorphonuclear leucocytes. Wallace makes a number of extremely important observations; he says that the lesion in its early stages is apparently longitudinal, running up and down the muscles. Muscles and groups of muscles are involved while others escape. There is little tendency for the infection to pass from one muscle to another. Crepitation is apparently a late phenomenon. Gas crepitation develops in the later stages of the disease. Wallace quotes the paper I have already referred to by Mullally and McNee,[5] in which secondary gas gangrene occurred at the site of hypodermic injections. A similar case occurred in my own series, in which gas gangrene developed in the track of saline infusion, performed in the chest wall during amputation in a case of gas gangrene of the thigh.

Wallace further states that "many men who die of the effects of gas gangrene in the clearing stations die before there is any marked suppuration; it may be that the suppuration and involvement of the fascial planes are seen after the patients have left the front, being a late manifestation of the disease." This supposition is borne out by my own observations made upon cases which have been incised for gas gangrene in France and hospitals in this country. The cases already quoted in which suppurative areas were found at the extreme limits of the acute gangrenous process may be taken as one type of sequelæ; the other type, surgical wounds, in which gas bubbles are found in the pus, local spread of the original mixed suppurative process, and radiating areas of tissue-necrosis (incipient gangrene), from which members of the anaerobic group of bacilli can be isolated. Cases have been seen which had been operated upon for gas gangrene in France; profuse discharge of pus was present, and in the pus both B. perfringens and B. malignant œdema were isolated without difficulty, showing that whilst the actual organisms of gas gangrene are still present in the wound, the surgical expedient of wide incision had limited the development of further spreading gangrene. In Tables V. and VI. (Section II.) the bacteriology of this type of case is given and the relative proportion of the species of bacteria is seen to be the chief difference between acute gas gangrene and chronic or subacute anaerobic inflammation.

Wallace suggests that the infection travels inside the vessels just before or after the circulation has ceased, the open ends of the vessels on the infected wound being the starting point. There is no doubt that this is the right explanation in the early stage. The description of the histology given above and the illustrations, Figs. 11 and 12, support the view that blood infection is the important channel of dissemination. The rapidity with which the disease spreads, the intimate relation of the organisms to the blood-vessels, and the fact that they are found within the vessels, demonstrate that they have entered before coagulation occurs. The occasional exacerbation of symptoms of gas gangrene after "subsequent" surgical interference confirms the view that the open ends of the vessels are the portal of entrance. In the chronic or recurrent cases the local development of gas may split and open the tissues, thus allowing the organisms to enter the vessels. There is another and probably a more important factor in the spread of infection which has support from clinical and bacteriological evidence—i.e, the elaboration of digestive enzymes in the affected areas. We have evidence in the first place that recurrent secondary hæmorrhage takes place from a wound; this point has already been dealt with in Section II., Table VI., and also in Section I. in discussing sinus formation. Secondly, the bacteria isolated from the wound in such cases are organisms whose proteolytic activity is demonstrable—i.e., B. malignant œdema, B. proteus. Further, after many months the tissue from the depth of a sinus has been shown to contain the B. malignant œdema, and histologically patches of tissue-necrosis have been observed.

Histological evidence, clinical evidence, and bacteriological evidence therefore may be correlated, and point to tissue digestion as of paramount importance in furthering the spread of gas gangrene. Cuthbert Wallace's observation that single muscles and groups of muscle tend to be affected suggests the infection of a common blood-supply. Emery found that in order to facilitate the development of B. perfringens the addition of chalk is of considerable assistance, and that in tubes to which chalk had been added the development of the organisms was accelerated, and that in such tubes the amount of free acid in the medium was small. He also points out in discussing the question, "Is B. perfringens actually the cause of gas gangrene?" that the organism, though found mixed with other bacteria in the superficial layers, is present in increasingly great numbers as the deeper layers of the infection are approached. My own

DESCRIPTIONS OF ILLUSTRATIONS.

(I am indebted to my friend, Mr. Cyril Hill, F.R.M.S., for the photomicrographs.)

FIG. 7.—*Localised gas gangrene.*—Compound comminuted fracture of ulnar and radius tissue removed at operation five days after injury. Evil-smelling black pus containing many gas bubbles. The tissue shows heavy coccal infection (top right hand) at part corresponding to wound cavity, various large bacilli are seen penetrating the deeper structures, which have lost most of their nuclei. Both B. perfringens and B. malignant œdema were isolated. Gram-Weigert × 1000.

FIG. 8 (from Case 1, Table VII.).—*Acute gas gangrene.*—Humeral biceps 15 hours after ligature of axillary artery. Section of affected muscle. The muscle bundles are seen widely separated and all connective-tissue structure has disappeared. Large numbers of B. perfringens are seen lying in the spaces between the bundles, which in places are undergoing digestion. Stained Gram-Weigert × 500.

FIG. 9.—*Acute gas gangrene.*—Compound comminuted fracture of femur, much œdema, gas infiltration slight but present, a crack probably caused by gas pressure is seen extending across the upper part of the field, and from it another commencing split is seen in which are a number of spore-forming organisms of B. malignant œdema type. The muscle from which this section was cut showed general blackening (malignant œdema reaction). Stained Gram-Weigert × 1000.

FIG. 10.—*Acute gas gangrene.*—Extensive flesh wound of thigh; no bone injury. Similar case to Fig. 7, but this section was obtained at a distance from the gas-infiltrated area; the muscle was red, Wallace's "red death" (B. perfringens reaction). The remains of a few nuclei are seen and many Gram-positive bacilli. Stained Gram-Weigert × 500.

FIG. 11.—*Acute gas gangrene.*—Deep flesh wound of buttock. Subcutaneous and muscular tissue at the extreme limit of the gas infiltration of the thigh, near knee. The upper part of the figure is the subcutaneous tissue; between it and the muscular tissue is a crack due to gas infiltration. A small vessel, the walls of which are rendered distinct by the Gram-positive organisms adhering to the walls, lies just above the crack, and at two points, one to the right and another to the left, the vessel wall has ruptured. The muscular tissue is full of phagocytes. Stained Gram-Weigert × 250.

FIG. 12.—*Acute gas gangrene.*—A portion of the muscular tissue from the same case more highly magnified, showing the commencing disruption of the muscular fibres and the large Gram-positive organisms (B. perfringens) within the polymorphonuclear cells. Stained Gram-Weigert × 500.

FIG. 7.

FIG. 8.

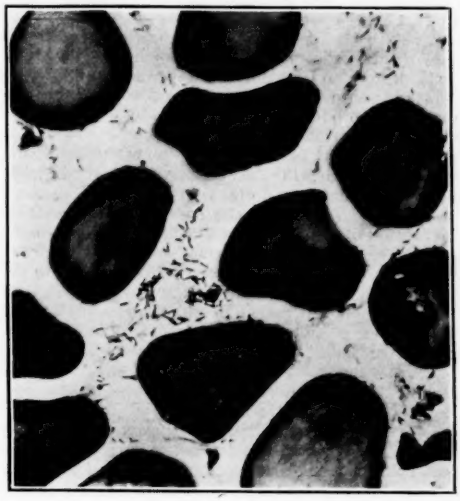


FIG. 9.

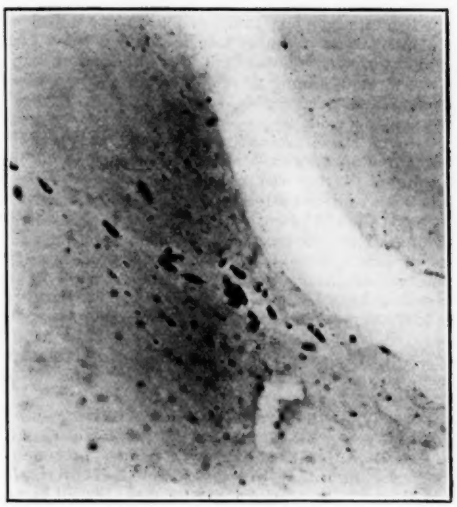


FIG. 10.

FIG. 11.

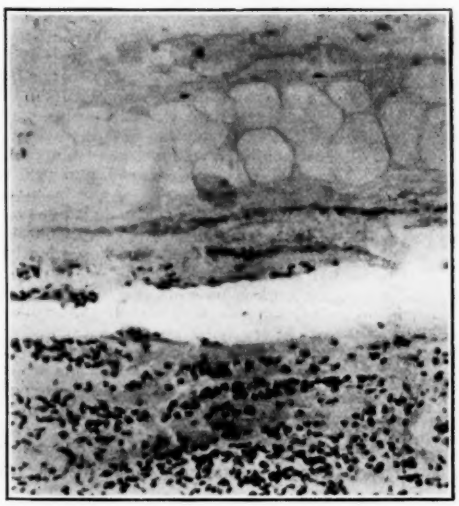
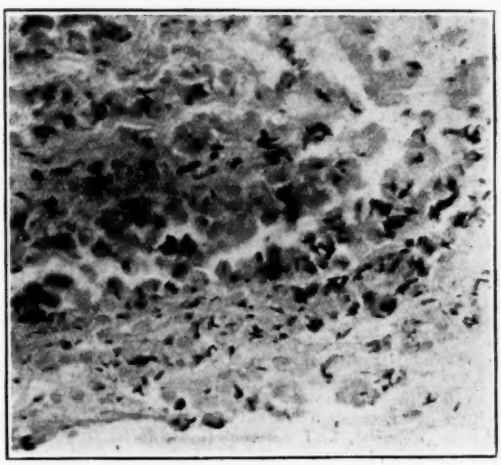


FIG. 12.



observation on the histology of gas gangrene given above entirely confirms the presence of the anaerobes in greatest numbers in the deeper parts of the tissue (see Figs. 8, 9, 10, 12). Emery also calls attention to the original experiments of Welch—namely, that if an animal is infected with B. perfringens, killed, and then incubated the bacilli grow with great rapidity throughout the body, but are found in greatest numbers and produce the largest amount of gas in those organs which are richest in sugar.

Emery lays down as one of the important factors, if not the most important, in the spread of gas gangrene the inhibition of leucocytic activity by the toxins produced by the organisms. Taylor,[9] on the other hand, regards the gas fragmentation of the tissues as the chief cause of dissemination, and suggests the gas pressure occludes the circulation in the tissues and further assists the organisms to diffuse. He says: "No cases of subcutaneous infection without previous muscular invasion have been seen among the patients. The pathology is therefore chiefly limited to muscle destruction." He notes a sweet odour of the gas escaping from the wound and that it explodes if lighted with a match. My own observations upon the tissues are substantially in agreement with those of Taylor, but I am inclined to interpret the phenomena somewhat differently, to regard the gas infiltration as a stage of the tissue alteration and coagulation necrosis as the primary lesion. Mullally and McNee and Taylor note the presence of polymorphonuclear leucocytes as usually occurring in the depths of the infection, but in those cases I have examined, as noted above, the outstanding feature of the deep areas of infection is the absence of any cell proliferation. (Fig. 8.) Taylor's illustration of muscle débris with gas bubbles does not show any active cell proliferation. Taylor says the bacilli are massed around the external portions of the muscles. This feature is characteristic of certain muscular fibres, and is, I believe, the second step in the infection, and it is presumably in such areas that rapid gas-formation occurs. The fulminant cases of gas gangrene are accompanied, as the name implies, by enormous development of gas, often taking place with such extraordinary rapidity that the phenomenon has been aptly described as explosive.

General Summary of the Various Ascertained Facts Relating to Acute Gas Gangrene.

(1) The syndrome is rapid, at times explosive, in onset.

(2) The histology of the tissues points to widespread and rapid destruction which the occlusion of tissue circulation alone seems inadequate to explain.

(3) Anaerobic organisms are always demonstrable, B. perfringens especially in the areas of extreme gas formation, but B. malignant œdema may usually be found on careful examination.

(4) In 75 per cent. of septic wounds uncomplicated with acute gas gangrene, anaerobic bacteria similar morphologically and culturally with those of gas gangrene are demonstrable.

(5) The toxicity of B. perfringens and B. malignant œdema cultures is invariably low even when isolated from fulminant cases.

(6) Phagocytosis of B. perfringens is observed both *in vitro* and *in vivo*.

(7) The two organisms found in gas gangrene differ in their biological activities. B. malignant œdema is essentially proteolytic. B perfringens is essentially a fermenter of carbohydrate.

A critical consideration of the various phenomena relating to the gas production by anaerobic bacteria, especially B. perfringens, therefore appears to promise the most likely explanation of the tissue destruction and the march of the disease.

The production of gas by B. perfringens upon milk often occurs with extreme rapidity, and is apparently related to some physical balance which having been attained the generation of gas occurs with violence, the milk clot becoming torn and disintegrated; so rapid is the associated production of acid concomitantly that the organisms quickly die off and subcultures from the milk tubes are frequently negative. This phenomenon of sudden gas formation is also exhibited by other anaerobic bacteria; thus, if a suitable medium of magnesium, calcium chloride, &c., in distilled water is prepared, and pure cellulose in the form of filter paper added and a small quantity of Thames mud, the flask placed under strictly anaerobic conditions and incubated, gas is developed and the filter paper disintegrated. Some time usually elapses before the gas is given off in any quantity, the latent period being up to three days, but when the equilibrium point is reached the action is frequently so violent that the cotton-wool plug may be driven out of the flask. The phenomenon, due to anaerobic cellulose fermenters, is strikingly similar to the sudden development of gas in cases of gas gangrene, and, moreover, again suggests that anaerobic fermentation may have a "critical point" below which activity is slow. Further research in this direction is in progress.

Wallace, in discussing the theories of the disease as suggested by Taylor and Emery, adopts the *via media*, that both views—namely, the primary toxin view of Emery and the gas fragmentation suggested by Taylor—are both of importance in the production of infection. On the other hand, Taylor calls attention to the fact that the production of toxin by the B. perfringens is extremely small; this is the experience of all who have attempted to extract the toxin from B. perfringens cultures. Emery agrees that the amount of toxin produced is extremely small, but by using 48-hour culture with the addition of chalk the fluid produced inhibition of leucocyte activity, but he says even then all cultures did not give satisfactory results.

Analogy to other infections has led to the postulate of a "toxin" as the cause of tissue destruction in gas gangrene, notwithstanding the fact that the toxicity of broth cultures *in vitro* is extremely small. On the other hand, Dale and Barger have shown that *vibrion septique* produces toxic material when grown upon muscle, but they showed that this toxic agent was probably free ammonia. Now, when carbohydrates are fermented with gas production various products are formed, among which organic acids and alcohol are paramount. B. perfringens is a carbohydrate fermenter, producing acid as well as gas, as may be demonstrated in milk and also in *meat cultivations*. The red colouration of cooked meat produced by B. perfringens in the laboratory is exactly similar to the red colouration seen in affected muscles in man and aptly termed by Wallace "red death." The reaction of the *red meat* in culture tubes is acid; so, too, is the *red muscle* in gas gangrene. The muscle sugar and glycogen of the tissues is obviously the substrate from which the gas is derived, and the fermentation of this substrate with gas formation must be associated with a corresponding development of acid, the tissues in cases of gas gangrene giving a distinct acid reaction. Sir Almroth Wright, quoted by Emery, is of opinion that there is a marked decrease in the alkalinity of the blood in cases of gas gangrene.

I have already pointed out above that the tissue changes in gas gangrene are extremely rapid, that tissue coagulation and disappearance of the nuclear staining precede the evolution of gas, and that the destruction of the tissue is more rapid than can be ascribed to the cessation of circulation by gas pressure. The appearances certainly suggest a toxic agent, but the consensus of opinion derived from animal experiment negatives the presence of a highly virulent and diffusible toxin.

Is there any other product of the biological activity of B. perfringens which is produced in considerable quantity which can account for the widespread damage? Gas has been suggested, but with inosite and glycogen present in the muscle gas means carbohydrate fermentation, and carbohydrate fermentation with gas production entails production of *acid*. B. perfringens not only produces gas from cooked meat *in vitro*, but turns the meat a curious red, and this red meat gives an acid reaction. The muscles in the vicinity of gas gangrene before they have become riddled with gas have a curious red colour (Wallace's red death). This colouration and that of the meat in the culture tubes are identical. Further, if the acid formed in a culture is neutralised as soon as it is formed, the organisms continue to ferment the substrate with the production of gas until all the available carbohydrate is exhausted; if, therefore, the acid produced from the carbohydrates in the tissues be neutralised as it is formed, continuous fermentation and continuous gas production will take place, there will then be little or no free acid in the tissues; physiologically the fixation of acid by the tissues is possible.

One other point may be adduced. The tissue fluid escaping from the limits of the gangrenous process has been

demonstrated to be precipitated with weak acid, and it is not improbable that the progressive spread of the gangrenous area may be accelerated by precipitation of the œdema fluid in the tissues themselves through the action of the acid produced by carbohydrate fermentation.

It is not suggested that no toxin is produced by B. perfringens, although so far no highly virulent one has been obtained, but it seems reasonable to correlate the demonstrable acid production of the organism with the tissue changes found in gas gangrene rather than to postulate a toxin which experiment has so far failed to demonstrate.

CONCLUSIONS.

The conclusions which may be broadly stated arising from the facts scheduled in the third section of my report relate mainly to certain tissue reactions against bacterial infection, and may be briefly summarised :—

(1) That the energy dissipated in the tissues from projectiles produces changes in a wider area than that immediately lacerated by the projectile itself.

(2) That the cellular activity promoting repair in the affected areas proceeds concomitantly with degenerative processes; with the degenerative processes are associated anaerobic bacteria. B. perfringens, B. malignant œdema, and possibly B. Hibler IX. type.

(3) That there is direct histological evidence of tissue digestion, in addition to necrotic changes due to traumatism or coagulation owing to interference with circulation. Evidences of degenerative tissue changes are found in tissue removed from wounds at long periods after the original infection of the wound.

(4) That acid production by anaerobic bacteria of the perfringens class is an important factor in the determination of clinical gas gangrene.

(5) That the general blood reaction in the direction of leucocytosis is more related to infection with the pathogenic cocci than the anaerobic bacilli.

In the three sections of the present report an attempt has been made to correlate certain facts obtained in the course of an inquiry as yet uncompleted, and this, the concluding section, is perhaps more an indication of the lines upon which research is proceeding. The examination of the tissue reactions in the wounds has been found to be in close agreement with the general bacteriological details given in the previous sections. The bacteriological data as to the organisms occurring in the depth of the sinus have been confirmed by direct examination of the tissue concerned. The bacteriological evidence of sequestered organisms in the sinus walls of "flare" cases also receives striking confirmation from the histological examination. The evidence adduced confirms the opinion previously expressed that the organisms remaining in the tissue retain their activity and potentiality for disease. Theoretically there is further evidence that the use of vaccine therapy of appropriate antigen is of advantage in combating the infections. Sir Almroth Wright,[10] in his address on wound infections, says :

"None the less we shall do well carefully to consider in connexion with the employment of vaccines in the treatment of imperfectly drained wounds certain questions. It is clearly a matter for consideration whether—despite the fact that the output of pus from the wound is not diminished—there may not be some useful clinical result from the vaccines. In short, it is not unreasonable to think that the antisepsis vaccines might aid the surgeon in his conservative surgery, and might enable him to hold on longer when trying to save a limb.

Sir Almroth Wright thereafter points out the importance of drainage in wound treatment.

The histological evidences I have advanced strongly support the conclusions of the second section of my report and the opinion of Sir Almroth Wright cited above. No drainage in the ordinary sense of the term can easily affect the contorted intricacies of a sinus passing first of all into bony tissue and thereafter radiating in several directions; it is in this type of wound, or rather sequelæ to a wound, that the bacteria are found lodged in the tissues, partially shut off from the action of the living cells. Operative interference sets them free; they may, and do, reinfect the surrounding areas, and to raise the patient's resistance to such disability is clearly a therapeutic step of supreme importance.

Continued at foot of next column.

A NOTE ON
THE VALUE OF VACCINE THERAPY IN THE TREATMENT OF SEPTIC GUNSHOT WOUNDS.

VIEWED FROM A SURGICAL ASPECT.

BY R. H. JOCELYN SWAN, M.S. LOND., F.R.C.S. ENG.,

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DURING the last two years a very large number of cases of septic gunshot wounds have been under my immediate care, and as some of these have recently been brought into prominence in a series of articles in THE LANCET by my colleague Mr. Kenneth Goadby, under the heading of "An Inquiry into the Natural History of Septic Wounds," it has occurred to me that a short note from the surgical aspect of these cases might prove of benefit to my surgical colleagues who are engaged in similar work to myself in base hospitals.

I must confess that when first I commenced the treatment of these septic cases in September, 1914, I, in common with many surgeons, was inclined to look upon vaccine therapy as of a very minor importance, but after a few months' work with Mr. Goadby became convinced of the value of appropriate vaccines, and now seek his assistance in the treatment of my cases. In our earlier work the routine bacteriological examination ot the wounds showed that the large majority were infected with multiple organisms, but nearly all contained a bacillus of the coli or proteus group, pyogenic cocci and anaerobic gas-forming organisms, and it was not long before we recognised that it was the admixture of the proteus and the cocci which paved the way for the anaerobe to invade the tissues in the immediate proximity of the wound and cause the breaking-up of the muscle tissue and the partial digestion which is now recognised in these wounds. Following up this line, I have now had a large number of my cases treated with a mixed vaccine of proteus and streptococcus, and can without any hesitation say that the treatment has to a large extent assisted the other methods of treatment carried out on ordinary surgical lines.

To such an extent have I modified my former views as to the value of vaccine in these cases, that I now direct that every case arriving from overseas with a septic wound should receive an initial dose of a mixed polyvalent vaccine of proteus and streptococcus until the true bacteriology of the individual wound can be worked out and before any surgical measure, other than freely incising the wound to secure adequate drainage, is adopted. This may appear at first glance as a "shot in the dark," but it is only in a comparatively few cases that a mixed infection containing both proteus and streptococcus will not be found, and I would make a note of the necessity of making an examination of both the superficial and the deep aspects of the wound, for we have found so frequently that the deeper part of the wound only will give the true indication of anaerobic activity. The future course of vaccines naturally depends upon the examination revealed in the individual wound, when appropriate combinations can be given.

In some cases operative interference of some sort is necessary as an urgent measure before vaccine therapy can be given, and it is in these cases that the operation is so frequently followed by pyrexia to 102° to 103° F. for from

Continued from preceding column.

Note.—A supply of the sensitised antisepsis vaccine, referred to in the report, is available, and on application will be sent, with full instructions for administration, to any medical officer in charge of hospitals treating septic gunshot wounds.

References.—1. Lazarus-Barlow: General and Experimental Pathology, p. 252. 2. Colonel Sir Almroth Wright: THE LANCET, April 17th, 1915, p. 789. 3. W. d'Este Emery: THE LANCET, May 6th, 1916, p. 948. 4. Muriel Robertson: THE LANCET, Sept. 16th, 1916, p. 516; Journal of Path. and Bact., April, 1916. 5. W. Barger and H. Dale: Brit. Med. Jour., Dec. 4th, 1915, p. 806. 6. Kenneth Taylor: THE LANCET, Jan. 15th, 1916, p. 123. 7. Cuthbert Wallace: Brit. Med. Jour., Sept. 16th, 1916, p. 381. 8. G. T. Mullally and J. W. McNee: Ibid., 1916, i., 478. 9. Kenneth Taylor: Journal of Path. and Bact., vol. xx., No. 4, p. 384. 10. Sir Almroth Wright: THE LANCET, May 17th, 1915, p. 878.

24–48 hours, whereas similar cases in which vaccines have been used usually show no pyrexia even when anaerobic gas-forming organisms were proved to be present in the depth of the wound. In the large majority of cases arriving from overseas I contend that no operation should be performed without the knowledge of the interior of the wound afforded by a thorough radiographic examination, particularly as regards bone injury and the presence of metal fragments, and it is just this time that is so valuable in an attempt to immunise patients against the proteus and streptococcal infection that, in my opinion, it should be done in all cases.

I have found the greatest value of vaccine therapy in the treatment of complicated septic fractures of long bones and of fractures which open into joint cavities. In the treatment of septic compound fractures I now make a routine practice of giving a preliminary dose of polyvalent vaccine (proteus and mixed streptococci), and then after two or three days freely open the wound to secure adequate drainage, approximating the fragments and only removing those fragments which are undoubtedly completely separated, at the same time taking advantage of the opening of the wound to obtain further bacteriological examination. Extension apparatus of various types or splints suitable to the individual fracture are applied, but should the resulting position of the fragments prove on further radiographic examination to be unsatisfactory, I have no hesitation, after a further few doses of specific vaccine, in securing the bone fragments in apposition by means of silver wire or even bone plates in the presence of sepsis, and can now look back on a series of cases in which not only have limbs been saved, but bones in good alignment and functional use. Further, the result as regards sinus formation and necrosis of fragments of bone in the seat of fracture has been more appreciably lessened in those cases in which vaccines have been used than in those in which exactly similar surgical measures were employed without the assistance of vaccines.

In the treatment of septic gunshot fractures which involve a large joint, I am sure that vaccine therapy holds an important place. I have been so disappointed in the past with the ultimate result obtained in these cases, where the resulting immobility of a joint such as the elbow or the shoulder so seriously affects the wage-earning capacity of the patient, that I have, after an immunising course of vaccine, proceeded directly to excise the joint in the presence of sepsis, leaving the cavity freely drained and following with an appropriate specific vaccine. In these cases I have been able to obtain a freely movable and serviceable limb, and a much better result than after excising a fixed joint after the wounds have healed, when the tissues around the joint are so matted by the long-continued suppuration. I hope to be able to refer more fully to the treatment of septic fractures and to fractures involving joints in a future article.

Another feature which has impressed me very forcibly is the freedom from secondary hæmorrhage in cases treated with a polyvalent proteus and streptococcal vaccine. Whereas before its use secondary hæmorrhage was not uncommon in septic wounds, I have had no case under my care in which it has occurred where vaccines have been employed. In my earlier work with Mr. Goadby I kept two wards of cases untreated with vaccine in order to compare the results obtained in wards in which vaccines were used and it was in those cases not treated with vaccine that secondary hæmorrhage occurred. Surely this cannot be a coincidence where exactly similar surgical measures were adopted, but must in some measure be influenced by the vaccine; it seems probable that the control of the proteus and streptococcal infection arrests the digestive action in the tissues of the anaerobic coexisting infection.

I cannot venture to discuss the bacteriological problems involved, but I am convinced of the great use of vaccines as a supplementary treatment to surgical measures in septic wounds, and am satisfied that the routine employment of a polyvalent vaccine of proteus and streptococcus is of value in inhibiting the tissue-necrosis caused by anaerobic bacilli, which are so commonly associated with these organisms in gunshot-wound infection.

I must thank Colonel R. J. S. Simpson, C.M.G., A.D.M.S., Woolwich, for permission to bring forward this note, and especially my colleague, Mr. Goadby, for the enormous amount of work he has undertaken for me in the examination of my cases and for his ready assistance at all times in the preparation of vaccines for the treatment of the cases.

THE PSYCHOLOGY OF MALINGERING AND FUNCTIONAL NEUROSES IN PEACE AND WAR.

BY THOMAS LUMSDEN, M.D. ABERD.,
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IF individuals complaining of symptoms which are characteristic of hysteria, neurasthenia, or malingering would be so accommodating as to keep within the limits precisely laid down for each of these conditions in our good text-books, the task of the physician dealing with them would be comparatively simple. The fact is, however, that almost invariably the three states mentioned are combined one with another in differing degrees, so that a patient originally hysterical may become neurasthenic, and may also malinger for sympathy or for gain of a more sordid nature. Frequently only two of these disorders are mingled in cases we have to deal with, so it happens that there are in all seven possibilities; a patient may have any of the three conditions in a pure state or any two, or all three at once.

I do not propose here to describe the symptoms and signs of hysteria or neurasthenia in detail, since these can be found in any ordinary text-book of practice of medicine; I shall instead take a few clinical cases as examples and discourse upon them in the light of the experience I have accumulated and the principles which seem to me to emerge therefrom.

Hysteria.

CASE 1.—I was called to see this young woman, and found her lying on a bed, being held down by six people while she was going through the evolutions characteristic of hystero-epilepsy. Her "fit" had already lasted half-an-hour and showed no sign of ceasing. She was waving her arms and legs, wildly jerking her body now up, now down, frequently assuming the opisthotonic posture and resting on her head and heels; at other times she kept banging her head on the pillows. I removed everyone except her mother from the room, laid her on the hard floor instead of the comfortable bed, and suggested that the fit was about to cease and that certain signs about her eyes showed this, adding that if it did not stop within two minutes it would be necessary to throw cold water right over the patient. The "fit" continued in spite of this threat, but having obtained a pail of water, and splashing a little of it on the patient, with the apparent intention of emptying the whole over her if necessary, the patient rapidly recovered. She was put to bed and was quite normal to all appearance next morning.

This was an example of pure hysteria and shows the following characteristics. The cause was emotional and the fit was in the line of an explosion of suppressed and accumulated feelings—a sort of emotional Jacksonian epilepsy. This is very characteristic of hysteria; whether it shows itself as aphonia, paralysis, or as a simple hysterical fit it is in every case an outlet for suppressed emotion; and is associated with a subconscious desire for sympathy or notoriety.

Hysteria is more a lack of will to do right than a will to do wrong. Looking deeper behind that illusive term "will" we find that in the hysterical patient the highest centres cease to control the lower subconscious centres, inhibition gives way, and the abnormal manifestations appear. All my experience of hysteria leads me irresistibly to the conclusion that this disease is nothing but the vicarious expression of unsatisfied desire, usually of a sexual nature. Civilisation and popular morality deny such desires and many other motives, their natural outlet, yet these motives are so powerful that some discharge of all the potential energy they represent must take place, and hysterical symptoms are the result.

All action may be regarded as the modified result of the energy which accumulates in the brain, by the summation of afferent impulses and of the desires (memories of pleasures) which they awake. When there is nothing to prevent the normal and evident action suggested, all is well; the desires are satisfied and the potential energy they represent is dissipated. But when custom, public opinion, conscience, &c., raise objections a struggle ensues; the normal outlet may be prevented, but the potential energy is not used up yet, and accumulates till it compels *some* expression for itself, and hysterical manifestations result. Who, then, is to blame for the condition—the patient whose desires are clearly beyond her own control,

or the public opinion and laws which deny those desires their normal outlet? I personally blame the unnatural conditions of our so-called civilised life; I pity the individual, while I blame the system and the lack of human charity.

A more profitable line of inquiry is, How are we to prevent or cure such cases? My answer is: In a general way prevention is only to be attained by our resuming or acquiring more natural habits and customs, and this can only come from a more intimate study and knowledge of ourselves and our environment; of Nature and her laws: once these are truly appreciated, they will involuntarily be followed, and evil results of unnatural restrictions (e.g., hysteria) will disappear. Sin after all is merely ignorance. Evil is only folly misunderstood and misnamed. To work out this hypothesis is a wide subject which must be reserved for another occasion.

In any particular case cure is to be sought only in two directions: (1) By arranging that the desires attain a sufficient outlet, e.g., in the case of sexual desires by marriage before the brain has become permanently warped; and, alternatively (2) if this is impossible, then by other forms of occupation the energy which has been finding unnatural expression may be used up through some different channel; hard physical work will prevent lust, and charity may replace a craving for selfish sympathy. Altruism makes in the end for happiness, while egotism leads to misery, worry, and hysteria.

Neurasthenia.

CASE 2.—The patient comes to me complaining that he has lost all his energy, he gets exhausted on the least exertion either mental or bodily, his memory is failing, he has lost all interest in his work and even in his amusements, he suffers from pains in his head and back, he is losing weight, and his sleep has become fitful, uncertain, and unrefreshing, his appetite is poor, he suffers from "indigestion," and he has a sense of depression so deep that he has even contemplated suicide. I find on inquiry that he has been overworking himself for months past; he has also been worried monetarily and at home. He is weak but irritable, and is a pure example of neurasthenia.

Each of us has a banking account in the nerve energy bank, and our state of well-being (in this direction) depends on our balance at this bank. If our expenditure is too great or our income insufficient, our balance inevitably declines or disappears; we may even become entirely bankrupt; we then suffer from neurasthenia. This bank is in our brain cells, and the substance we pay into it is the mother substance of thought and energy—cf., myosinogen in the case of muscle. We make this substance, which I propose to call "ergogen" from our food, if it is sufficient and if our digestion is good; sufficient sleep diminishes our expenditure of it. Work, and especially mental work, and worry use up ergogen and thus diminish our "balance" of it in the brain cells. Cure of neurasthenia is thus to be sought in two directions: (1) By increasing our income of ergogen—i.e., taking sufficient food and digesting it thoroughly; (2) by diminishing our expenditure of this precious substance by sleeping and resting sufficiently, and by avoiding worry as far as may be.

A fact which is sometimes overlooked is that brain cells depleted of ergogen are irritable and hypersensitive, though they are weak for action. I sometimes compare them to a supposititious regiment of old colonels, who would be very irritable and peppery, very prone to wrath, if you trod on their toes, and yet they would be of very little use at digging a trench, or at marching on the toes which seemed so full of energy when trod upon by others.

Another characteristic of neurasthenic patients is their tendency to introspection; hence arise all the various aches and pains from which they suffer and of which they bitterly complain. In many instances they magnify by this means the normal bodily and organic sensations into aches and pains. It is as though they saw their own interiors with the fovea centralis of the mental vision instead of with the retinal periphery of the mind, as the normal man should; or, again, as if they always heard their own internal clock ticking, instead of disregarding its sound as long as it is regular and normal, as we do in the case of a clock ticking regularly in the room we are working in.

Weir Mitchell treatment cures these cases by diminishing work and increasing the ergogenic income by special dieting. Equally effective as a means of cure is residence at a quiet farmhouse, with at first rest, and later a gradually increasing amount of exercise, and good country feeding all the time. I sometimes tell people to approach as nearly as possible to the type of existence of a turnip, or, if they prefer it, of a lily or a rose.

Malingering.

CASE 3.—A workman in the employment of a public company, which pays half wages to those injured on duty, and who is a member of two clubs and comes under the State insurance scheme as well, has hurt his arm while on duty; he now complains that the shoulder-joint is stiff and that he cannot raise his arm as high as his head. I find on examination now no evidence of past injury or present disease (the alleged accident was ten days ago). On making him place both hands on a chair-back and then step away from it, so that I may examine his back, his head descends readily between his shoulders; I then catch hold of his arm and tell him to stand up, when, of course, he is disappointed to find that he has been tricked into raising his "injured" arm till it is in the same line as his spine, and therefore high above his head, and this although my attempt to raise his arm before had elicited gasps and heartrending wails of pain. As there is a witness present he can no longer deny his fraud. I find on adding up his club money and half-pay under the Workmen's Compensation Act that his income when ill is actually greater than when he is at work. A further temptation in this case was the stupid provision of the Act that a man must be absent for 14 days if he is to be paid compensation right from the date of injury, and so this man was most anxious to remain off work till that period at the least. While dressing himself the man raised his arm quite freely as he put on his shirt.

This was, of course, a case of pure malingering, and there was, as one always finds, a clear motive for feigning disability. The motive was largely a monetary one, but there have been many examples recently of malingering in order to avoid military service. Malingering is an instance of wilful fraud, and is in one sense equivalent to theft, where a monetary gain is the one sought for; but in many of the combined cases, e.g., hysteria plus malingering, the gain looked for may be only notoriety or sympathy (see Case 4).

Combined Cases.

Hysteria and malingering.—Very many cases of hysteria have an element of malingering about them; indeed, hysteria may be looked upon as a sort of subconscious malingering in which the patient herself is deceived as well as, and sometimes even more than, others round her; to this subconscious fraud it is very common to find conscious fraud superadded.

CASE 4.—The patient was brought to me for a wound of the elbow. She was 17 years of age, and had the furtive look so characteristic of this type of hysteria. On examining the wound I found lying on the surface a piece of glass. The wound was a very superficial one, but had a good deal of blood round it, and the dress was also blood-stained. The patient said she had cut her arm by mistake, having put it "through the window" while attempting to open the same. The wound did not look as if it had been caused in this way, and on investigation it was found that the patient had just previously had a quarrel with her governess, and her parents had rather taken the latter's part. Being much annoyed, the patient went up to her own room and almost immediately returned with the wound mentioned; further, it emerged that one of the housemaids had seen from another window her young mistress deliberately break the window with a book. It is evident, therefore, that this was a case of a hysterical girl emotionally upset by a quarrel in which she had got the worst of it, and who deliberately broke the window and then scratched her arm in order to regain the sympathy she had forfeited, and to make those round her sorry that they had been hard upon her. This young lady was addicted to typical fits of hysterical weeping and laughter when emotionally upset.

Hundreds of cases of the combination of malingering and hysteria could be given, but Case 4 is sufficient. It is not surprising that this combination is so common, since the border-line between the conscious and subconscious parts, or rather phases, of our brains is not sharply defined; indeed, the one state passes imperceptibly into the other. "Concentration" passes gradually into reflection and musing, &c., as a river flows into the sea.

A case of hysteria entirely free from malingering is almost a rarity, so frequent and close is the association of the one condition and the other. The aim of the malingering is, however, seldom sordid in these cases, being only for sympathy, or at worst notoriety, as in the case of "blind" or paralysed girls who get their names into the papers every now and then, generally under the heading of "miraculous cures," and so on.

Hysteria and neurasthenia.—The combination of hysteria and neurasthenia is also very common, especially in the

patient's later years; indeed, I think it would be true to say that every uncured case of hysteria will become neurasthenic if the subject lives long enough.

CASE 5.—This patient, 40 years of age, had been typically hysterical in her youth. She never married, though she had had opportunities of doing so, because she did not wish to leave her mother, who would then have had to live quite alone. Two years ago the mother died, and the patient is now a typical hysterical neurasthenic; she has no energy, and she spends most of her time on the sofa, practically her only interest in life being her own complaints, whose name is legion. She is never free from "neuralgic" pains, mostly in the head and spine. She does not really wish to get well. I once nearly cured her by treatment in a nursing home, but finding herself putting on flesh and otherwise making good progress she insisted on coming out of the home and giving up the treatment. Another practitioner now listens to her woes and ministers thereunto.

There is, of course, a stage in these cases where it would be difficult to say whether the disease was more hysterical or neurasthenic; and, indeed, it does not matter much, for the treatment is the important thing, not the name. Wherever neurasthenic symptoms are present it will be well to treat, and if possible remove, them; but it may happen, as in the case just cited, that the hysterical part of the patient will resent the disappearance of any of her beloved symptoms, in which case, if, as is likely, the hysteria is a deeply-ingrained and old-standing disease, cure is very difficult or impossible. We may try to help the sufferer to regain some of the *joie de vivre* and to wish again to get well, and if we succeed in doing this by means of suggestion and the strength of our personality all may go well; but we have to deal with the ever-present harmful autosuggestion of the patient, and results are apt to be disappointing. Marriage, even at a comparatively advanced age, gives perhaps the best hope of cure if only the right man can be found; but the "right man" is usually not forthcoming, and I for one do not blame him.

"Traumatic neurasthenia" and "shell shock."—The true neurasthenic does not malinger; he is as much deceived as deceiving. It is true that he exaggerates sensations, making in this way mountains out of mole-hills, but this process is quite involuntary, and there is nothing to be gained by him; he really suffers very much as the result of his hypersensitiveness. Many doctors may disagree with this dictum, but I think if they do it will be because they call certain cases neurasthenic which I do not regard as such. For instance, there is a condition following after accidents which is often called "traumatic neurasthenia." A workman, it may be, is injured in a tramcar accident; he suffers considerably from shock at the time, and complains thereafter of pains in the head, giddiness, weakness in the back, palpitation, and so on. Such patients frequently malinger, but are they initially and essentially neurasthenic? I think not. I look upon them as late results of an emotional shock, and hold that they are in fact hysterical or mixtures of hysteria and malingering. Only when they have become inveterate, a neurasthenic element may appear, as it does in every hysterical case which lasts long enough; the case then becomes an example of the combination of all the three disorders mentioned above—hysteria, neurasthenia, and malingering. After a shock, for instance being blown up on a ship which is torpedoed, a sailor or passenger may lose his nerve so much that he shudders at the sight or even at the thought of a ship or the sea. This state (in so far as it is unreasonable) I look upon as clearly hysterical, a result of disordered emotions; it is true that it may induce neurasthenia if the man's livelihood entails voyaging, as he will worry for the loss of his occupation and pay, but the condition is not essentially neurasthenic.

Very rarely it may happen that a man who is already neurasthenic may have that condition aggravated or precipitated by an accident, but the accident is here only the last straw, and is not the real cause of the neurasthenia, and such are not the cases which are connoted by the misbegotten term "traumatic neurasthenia." Most of the cases of so-called "shell shock" are of this nature and very clearly show the stigmata of hysteria; they suffer from such symptoms as stammering, twitching, choreic or convulsive movements, anæsthesias and paræsthesias, all of which are hysteroid manifestations and not neurasthenic, as also are the loss of voice, sight, and sense of identity which are now and then results of "shell shock." The strain and worry of war do produce a number of cases of neurasthenia, but these are just the same as neurasthenia produced by similar causes (overwork and worry) in peace time, and are not the cases which are designated and advertised under the misnomers "traumatic neurasthenia" and "shell shock," terms whose vulgarity will always be associated in my mind with such horrible expressions as "Doing your bit" and "We shall win through."

As in all other cases of neurasthenia, these instances just mentioned as being due to the stress and worry of war conditions suffer from a lack of ergogen, and all that is required to cure them is peace, rest, and good country feeding, while the hysterical "shell shock" cases require and will be cured by firmer handling on "suggestive" principles. The cases into which malingering (as well as hysteria) enter form a third class to be dealt with similarly, whether they arise as the result of war, of accidents in peaceful times, or of a desire for sympathy or notoriety, as mentioned above.

Conclusions.

Hysteria is to be regarded as a disorder of the subconscious phase of the personality, in which suppressed desires and emotions manifest themselves vicariously by symptoms referable to any or all of the cerebral activities, motor, sensory, vaso-motor, or sympathetic. In hysteria the highest conscious centres and cells lose their control over the lower cerebral centres, which then act under the direction of the subconscious and emotional areas. The motives being denied outlet in their normal direct course find expression in some perverted and abnormal direction.

Neurasthenia is the state which results when the brain cells are deficient in "ergogen." The patient is bankrupt as far as energy goes, yet hypersensitive of afferent impulses reaching the brain. Rest and nourishment restore the balance of ergogen and so cure the condition. In this disorder a vicious cycle of weakness and worry is common; dyspepsia and depression, &c., may be similarly associated.

Malingering connotes the fraudulent feigning of symptoms or signs of disease selfishly for gain, and is a disease of the highest conscious cerebral centres in the frontal lobes.

As regards these conditions in relation to the war, pensions, and so forth, much harm has resulted from confusion between the three classes of cases referred to above—viz., (1) cases of pure neurasthenia due to overwork or worry; (2) hysteria following shock, i.e. the so-called "shell shock"; (3) hysteria combined with malingering, the gain sought for being either exemption from military service or a pension. Besides these there are, of course, cases of pure malingering.

I append in tabular form a résumé of the main distinctions between the conditions here dealt with.

Table showing the Main Distinctions between the Conditions dealt with.

—	Hysteria.	Neurasthenia.	Malingering.	Shock.
Cause.	Heredity; emotional upset; female sex; repressed (generally sexual) desires.	Heredity; worry; overwork; debilitating diseases; masturbation.	Dislike of work; desire for money, ease or sympathy not earned.	Accident; injury, physical, mental; operation; hæmorrhage.
Onset.	Sudden, varies.	Gradual, even.	Varies.	Sudden or gradual.
Symptoms.	Emotional; mercurial temperament; quick active mind, may be brilliant; protean symptoms involuntary, or may malinger, too; globus, spasms, fits, faints, &c.; "subconscious malingering."	Weak for action, but hypersensitive; memory weak; mind and body easily tired; introspective; dyspeptic; depressed and irritable.	Any which are easily feigned; pains in back; giddiness; lost senses, e.g., sight, &c., corresponding with the gain sought for; voluntary and conscious.	Collapse; cold sweat; dilated pupils; weak pulse of low tension; pallor.
Cure.	Marriage; full and pleasing occupation; suggestion.	Sleep, rest, and food build up ergogen; exercise later	Detection, or if it ceases to pay well.	Stimulants, fluids, alkalies, rest, food.
Pathology.	Motives get beyond conscious control; "auto-suggestion"; "buried complex."	Brain cells run down; bankrupt of ergogen.	Conscious and fraudulent; a moral cell disease.	Failing blood pressure; brain cells ill supplied with blood.

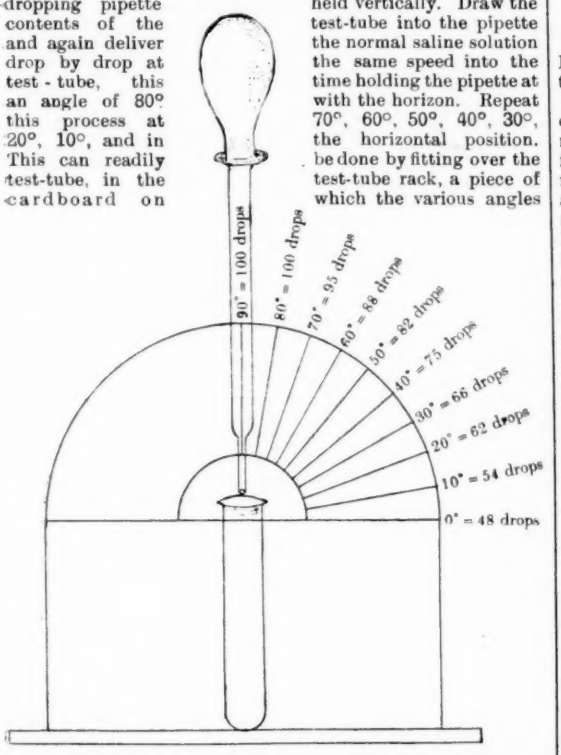
South Eaton-place, W.

THE ANGLE OF THE DROPPING PIPETTE AND ACCURACY IN AGGLUTINATION TECHNIQUE.

BY R. P. GARROW, M.D. ABERD., D.P.H.,
CAPTAIN, R.A.M.C.

IN an interesting article on the Serum Reactions of 300 Unselected Cases of "Enteric" in THE LANCET of August 5th, 1916, Professor Ernest Glynn and Dr. E. Cronin Lowe state, *apropos* of accuracy of technique: "It is *probably* advisable (the italics are mine) to hold the dropping pipette at the same angle when distributing the drops." If any doubt exists in their minds on this point it may be readily dispelled by the following simple experiment, which shows it is necessary that, in order to secure accuracy in dilution, the dropping pipette should always be held in a vertical position throughout the entire process of distributing the drops.

Experiment.—Part 1.—Deliver at a uniform speed into a wet test-tube 100 drops of normal saline solution from the dropping pipette held vertically. Draw the contents of the test-tube into the pipette and again deliver the normal saline solution drop by drop at the same speed into the test-tube, this time holding the pipette at an angle of 80° with the horizon. Repeat this process at 70°, 60°, 50°, 40°, 30°, 20°, 10°, and in the horizontal position. This can readily be done by fitting over the test-tube, in the test-tube rack, a piece of cardboard on which the various angles



are marked by lines. The dropping pipette is held against these lines while its contents are being delivered into the test-tube. (See diagram.)

Part 2.—Now fill the dropping pipette with normal saline and drop 100 drops at a uniform pace into the test-tube, holding the pipette vertically. Draw up this saline into the pipette again and discharge it a second time with the pipette still held vertically. Repeat ten times.

Result of experiment.—Part 1.—The number of drops obtained for the various angles from the vertical to the horizontal were:—

Angle...	90°	80°	70°	60°	50°	40°	30°	20°	10°	0°
No. of drops ...	100	100	95	88	82	75	66	62	54	48

Part 2.—The number of drops obtained from the same volume of normal saline discharged at a uniform rate, ten times, the pipette held vertically, were:—

100 100 99 99 99 99 98 98 98 98

The loss of two drops is, no doubt, due to evaporation.

Conclusions.—1. The number of drops, and therefore the size of each drop, which a dropping pipette will deliver from a given quantity of a liquid varies considerably with the angle at which the pipette is held.

2. For an equal variation of angle—e.g., 10°—the dilution error tends to be greater the further the angle is from the vertical.

3. The only correct position in which to hold a dropping pipette is the *vertical position*. It is the easiest to adopt and maintain accurately, and it is the least liable to error from slight alteration of angle.

4. The drop method, when used intelligently, is an extremely accurate method of making a series of dilutions for the estimation of the relative agglutinating titre of blood serum.

Medical Societies.

MEDICAL SOCIETY OF LONDON.

Epidemic Nephritis.

A MEETING of this society was held on Nov. 13th, Lieutenant-Colonel D'ARCY POWER, the President, being in the chair.

Captain LANGDON BROWN, R.A.M.C., opening a discussion on Epidemic Nephritis, said that acute nephritis was rare in men of military age. In wars it was not common, apart from the American Civil War, in which 14,000 examples of nephritis occurred, but this number included cases both of acute and chronic nephritis. In the central army the number of cases rapidly increased,[1] the incidence rising for 12 months and reaching as high as 1·5 per 1000. This was not repeated in subsequent years. In that war the military conditions were somewhat similar to those of the present war, a rapid advance and retreat being followed by a period of prolonged trench warfare. The units were involved in the same irregular and patchy manner. In our own army, up to the end of June, 1915, there were 1062 cases. Few occurred before February of that year. They increased until 1916, when there was a steady fall. The Belgian Army had been unaffected and the French Army little until July, 1915. In the Mediterranean zone cases did not occur prior to the movement of French troops to that area. A similar outbreak appeared among the German and Austrian troops. The cases on which the paper was based fell into groups. One of 58 studied at St. Bartholomew's Hospital, the other of 108 at the 1st London General Hospital. Nine were from the Mediterranean, the remainder from France. Few officers were included, numbering only 5 of the whole series and two others in addition. The cases were haphazard in their distribution. Only one patient had been in France for less than one month. The numbers increased for each month's stay in France, but fell again after the seven months' period was reached. Exposure could not be held to be of etiological importance, for there were few cases during the worst weather and the number increased after the spring when the violent fluctuations of temperature were passed. In the South African War there were practically no cases of nephritis, although the range of temperature was enormous. The same was true of the Suvla Bay operations and of the Russo-Japanese War. In 22 only of 166 cases in which the point had been elucidated was there a history of the patient having been wet; in the remainder there was no story of exposure. Cold, however, accentuated chronic nephritis. There was no evidence that the affection was dependent upon the water-supply as had been suggested. The solder and lead which might contaminate tinned foods had been blamed by some, but this was not a likely explanation or the condition would have been present in South Africa and Suvla Bay, where tinned foods were much employed. The urine of nephritis of metallic origin was, moreover, of a different character. By others excess of protein and a deficiency of fresh vegetables in the diet were held responsible, but this would not explain the increase in the French Army in July, 1915, nor was

[1] A chart showing the incidence of nephritis among the Northern Armies during the first part of the American Civil War appeared in THE LANCET of Feb. 19th, p. 392.

there any evidence of a co-existent intestinal toxæmia. Wounded soldiers were not especially liable to nephritis. It had been suggested that the nephritis was a complication of an epidemic of a suppressed form of scarlet fever, and the comparative freedom of the Indian troops, who are immune to that infection, was cited in evidence, as well as the occurrence of sore-throat at the beginning of the attack. A history of early sore-throat was obtained in 27 per cent. of his cases, but he regarded it as secondary to the cough. There were many points of similarity between scarlatinal nephritis and this form, but such a view would mean that there had been 10,000 cases of scarlet fever, all suppressed, and all free from desquamation, which seemed impossible. A previous history of nephritis was obtained in 13 only, so it could hardly be due to recrudescence of former nephritis. Nor was antityphoid inoculation the cause, for nephritis had not occurred in a similar manner among the troops at home or in South Africa. That the condition was due to a specific infection was suggested by the fever at the onset and preceding relapses, the spread to the French troops four months after its occurrence among the English and to the Mediterranean area when troops were transferred there from France. Its patchy distribution also resembled that of cerebro-spinal fever. The results of post-mortem examinations pointed to an involvement of the glomeruli and tubules, as in an infective nephritis. Examination of the urine, however, had afforded little support to this view, for of 21 examined bacteriologically 18 were sterile. Blood cultures were also sterile. Various organisms had been isolated from the throats of affected patients, but not more frequently or in greater numbers than among controls, and antibodies to these organisms were not found in excess in the blood. In two cases, however, Dr. Mackenzie Wallis had been able to reproduce albuminuria in rabbits by inoculating them with the urine of affected persons, and this after an incubation period of eight days, which corresponded approximately with the incubation period as estimated clinically. His investigations suggested that the infective agent was ultra-microscopic and filter-passing. A positive Wassermann reaction was obtained in 18 out of 56 cases examined; this might mean a corresponding incidence of syphilis, or, on the other hand, be due to another animal infection such as that by a filter-passing organism was supposed to be. Considering next the symptoms of the disease, he said that the incubation period was between 6 and 15 days. Premonitory symptoms, according to Captain Abercrombie, were met with in about half the cases, and were bronchitic, febrile, or abdominal (pain and vomiting). Œdema was usually the first symptom noticed, and was present in 97 per cent. of the cases, but generally lasted only a few days and was not often considerable. Early dyspnœa was noticed in 76 per cent., starting usually at the same time as the œdema, but ceasing sooner. It would appear from estimations of the alveolar air that the dyspnœa was not always associated with acidosis, uræmic or otherwise, and was possibly explained by a similar effusion into the lungs. He had not observed the wide fluctuations of the blood pressure described by Abercrombie. The commonest systolic pressure was 140 mm., and there were but few patients with a really high pressure, and these were men who had been painters or plumbers in civil life. The difference between the systolic and diastolic pressures was very considerable, being about 10 c.mm. Hg. These findings would account for the fact that cardiac hypertrophy and arterial changes were little evident. The urine was often much increased in amount, even in the acute cases. Red blood cells were seen in it in 102 of the 166 cases and white corpuscles in 79. A flocculent reddish-brown precipitate containing blood elements was commonly met with. Casts were found in the majority. There were blood casts in 2, epithelial in 37, fatty in 7, granular in 73, hyaline in 58. Retinal changes occurred in 18 per cent. and convulsions in 4 per cent., but these generally yielded quickly to venesection. As occasional symptoms were herpes and parotitis, suggesting an infective origin. Milkiness of the blood serum was not found in any of the specimens withdrawn for the Wassermann reaction except in one fatal case. Two cases only out of the 166 were fatal; in the majority the patient felt well when the œdema had subsided. The albuminuria was intermittent, and often relapsed, ceasing after a period of from 14 weeks to 5 or 6 months. Recovery might be complete after a long period of albuminuria. He considered that all soldiers who had suffered from nephritis should be regarded as unfit for foreign service, and if the albuminuria persisted for more than four months should be discharged. The diastase output must have returned to normal before a cure could be said to have been established. As treatment he recommended a low nitrogenous diet during the acute stages, but one containing considerable variety. The diet suggested contained 43 grm. of protein, 285 grm. of carbohydrate, and 50 grm. of fat, with a total calorie value of 1815. When the acute stage was over this might be replaced by an ordinary nitrogenous diet, including mutton or fish, and might contain as much as 95 grm. of protein, the total calorie value being 2690. His experience with theocine had been unsatisfactory, the drug appearing to act as a renal irritant as well as a diuretic and being unsuitable in acute cases. The same was true of diuretin. It was impracticable to flush out the kidneys in acute nephritis, but there was a risk in diminishing the intake too much. Hot-air baths had definite limitations; they were only useful if followed by diuresis. For hæmaturia he found no drug of certain value. With dry cupping his experience had been unfortunate. Venesection was valuable for cases not doing well and most efficacious for convulsions.

Lieutenant W. H. DUNN, R.A.M.C., recounted his clinical experience of nephritis in France in the casualty clearing station zone. No composite picture of the symptoms could be drawn, but a fairly clear group could be selected as characteristic. The patients had the appearance of health, showing little anæmia or loss of flesh. Dyspnœa was very common, but not urgent. The urine was usually considerable in amount and seldom diminished. The amount of albumin was usually 2–4 parts per 1000, but in some cases was 8 parts per 1000, and higher figures had been met with. In spite of this the urine was clear and was not smoky. The casts were commonly hyaline and epithelial; blood casts were uncommon. Rapid improvement was the rule. There was usually no fever. In some cases blood was passed in considerable amount; then fever was often associated. He was at a loss to assign any general cause. Against an infective process, like scarlet fever, was the fact that although the troops were in close contact with civilians the latter were unaffected. There was nothing to support the view that the ground was infective in particular areas. He had studied the pathological anatomy in 24 cases in all, of which 17 acute cases and 2 subacute cases were of the kind of nephritis under discussion. Little could be detected by the naked eye, except that on the cut surface of the cortex the glomeruli projected slightly as grey translucent nodules, not as red nodules, such as were seen in ordinary acute nephritis. Microscopically, catarrhal changes in the tubules were indicated chiefly by degeneration of cells; fatty changes were seen in some cells. Tubular hæmorrhages occasionally appeared. The main changes were found in the glomeruli. They were enlarged, and often pouted into the tubules, their cell content being increased. Desquamation of the covering epithelium was sometimes present. The vascularity was diminished. The capillaries were dilated, and contained abnormal nucleated cells. There was little evidence of reaction or degeneration Proliferation of the epithelium was met with. In two cases total infarction of the tufts was found, due to occlusion of the afferent arterioles. These changes corresponded closely with the book descriptions of glomerular nephritis, and were therefore not new. Special examination of the organs had failed to give any evidence of a bacterial cause. The lungs in one case were found to be acutely emphysematous and œdematous and to contain diffuse patchy hæmorrhages. The spleen also was the site of numerous small hæmorrhages and was slightly enlarged. Similar hæmorrhages were found in the brain. Detailed examination of the lungs showed a peculiar lesion of the walls of the infundibula and ends of the bronchioles. These were prominent and covered by dense fibrin, and had the appearance of having been cauterised. The changes found resembled those following the inhalation of Cl_2 or other irritant gases. The large bronchi showed a similar condition. In two other cases like changes were found, and in four others lesions showing a comparable but not identical change. In six out of the seven there was evidence of thrombosis of the capillaries in relation to the infundibular damage. Hæmorrhages occurred in the spleen and brain in two cases and were apparently embolic in origin. It

seemed that in many there was a process of multiple embolism in being, and this suggested that the kidney lesion was similarly caused, but no thrombi had been found in the glomeruli. In shell-gas poisoning the lung condition was very similar, and thrombosis of the pulmonary capillaries and cerebral hæmorrhages of embolic origin also occurred. In one case the kidney contained thrombi in the glomerular capillaries; in others there were no thrombi there, but proliferation of the endothelium. It was possible that thrombi had previously been present. Although it was not suggested that the nature of the irritant inhaled was drift gas or shell gas, it seemed clear that the origin of this form of nephritis was to be found in capillary embolism, and it might be in emboli derived from the lung lesion, which was of the kind recognised as due to an inhaled irritant.

Mr. W. H. JESSOP said that of 75 cases he had found that 71 per cent. had retinœdema with the occurrence of plaques and sometimes of detachment of the retina. There were few hæmorrhages. 57 per cent. of the patients were between 20 and 30 years old. The vessels were unaffected and the blood pressure was normal. All these changes could be watched from time to time and be seen to disappear. He could not but conclude that they were due to toxæmia, as also was the œdema elsewhere.

Mr. J. E. ADLER said that he had met with blood casts on several occasions. He regarded the diastase test as of the utmost value. In acute nephritis there was generally a low diastase reading. In 800 readings it varied from nil to 40. In the majority of cases a diastase value consistently low was evidence of low renal efficiency. Of 69 cases with a low diastase value, 31 showed blood in the urine and 38 no blood; occasionally blood was found with a high diastase reading. The phthalein test was the most valuable. To perform this 6·6 mgm. of phthalein was injected intramuscularly and the bladder emptied 1 hour and 10 minutes later, and every hour up to 3 or 4 hours. The test depended upon the amount excreted at the different hours. The amount excreted during the first hour should equal the total of the amounts passed at the end of the second and third hours. It agreed with the diastase readings in showing that the permeability of the renal cells was markedly decreased in nephritis, and it also indicated the advent of uræmia. The diastase readings and the phthalein test results were generally in agreement, but there were instances when the test was more reliable than the diastase values. The disadvantages of the diastase test were that a 24 hours' specimen was necessary, the readings were variable, much time and special apparatus were required, and the starch had to be made fresh every day. Its use necessitated laboratory work. He thought that both tests should be carried out in every case to enable a decision to be arrived at as to what should be done with the patients.

ROYAL SOCIETY OF MEDICINE.

SECTION OF DERMATOLOGY.

Exhibition of Cases.

A MEETING of this section was held on Oct. 19th, Dr. J. H. STOWERS, the President, being in the chair.

The following cases were shown.

Surgeon D. LOUGHLIN, R.N. (for Dr. H. BATTY SHAW): Case of Leukæmia Cutis. The patient was a man aged 37. Purple-coloured patches first appeared on his body eight months ago. Three months later an ulcer developed over the sacrum, and within another month lumps, which have gradually been getting bigger since, appeared in the skin of the trunk, limbs, and face. The patient was ill, febrile (temperature 101°–102° F.), and had the leonine facies typical of the condition. The lymphatic glands were not enlarged, and neither the liver nor the spleen could be felt. The blood count showed a diminution of red cells, some of which exhibited vacuolation and poikilocytosis; also macrocytes and microcytes were seen. The white cells were absolutely decreased, but there was a relative increase of lymphocytes. The histological specimen showed the typical infiltration of the tissues with lymphocytes.—Dr. F. PARKES WEBER recorded a somewhat similar case, which had been published under the name of Granuloma Fungoides.—The PRESIDENT referred to another case similar to the one shown exhibited by Dr. Lidiard at the first meeting of the Clinical Section.

Dr. H. G. ADAMSON showed, amongst others, a case of Schamberg's Disease. The patient was a man who had a chronic punctate inflammatory condition of the skin on one shin. When the lesions disappeared they left pigmented marks.

Dr. A. WHITFIELD: Cases of Pruritic Dermatitis caused by infection of mange from a kitten. The lesions differed from those of ordinary scabies, as they were small papules surrounded by an oval zone of erythema, and in some instances surmounted by a minute pin-head-sized vesicle looking not unlike a varicella papule. The lesions were generalised, but the fingers and wrists were free. In the kitten the acarus and a run, including eggs and fæces, were found in some scales removed from the skin behind the ears.

Dr. J. H. SEQUEIRA showed, amongst others, a case of Erythræmia in a man aged 28.

Dr. S. E. DORE showed a case of Localised Sweating of the Face and Hydrocystoma.

Dr. PARKES WEBER: Case of so-called Multiple Pigment Sarcoma of Kaposi. The patient was a Russian Pole, 26 years of age, who came to England when he was 1 year old. The disease began two years ago on the left hand. Microscopically the lesions were typical—i.e., the most prominent feature was the large quantity of thin-walled blood-vessels surrounded by a number of fibroblasts.

The PRESIDENT exhibited a case of Circumscribed Sclerodermia (Morphœa) in a girl, aged 7 years, of extremely nervous disposition. The child of healthy parents, she was stated to have developed the disorder a few weeks after being suddenly awakened at midnight by a bomb explosion one year ago.

An abstract of a paper on Acnitis in an Egyptian soldier was communicated by Dr. A. G. CHALMERS and Dr. J. MARTYN, and illustrations were exhibited.

LEEDS AND WEST RIDING MEDICO-CHIRURGICAL SOCIETY.—The first meeting of the session was held at the Leeds General Infirmary on Oct. 27th, Mr. W. R. Bates, the President, being in the chair.—The President gave some notes of cases that he had had the opportunity of observing over a long period. The cases described were of considerable clinical variety, and showed how uncertain was the element of prognosis.—Professor J. B. Hellier read a paper on the Treatment of Placenta Prævia, in which he discussed the place of Cæsarean section in dealing with this condition. He said that when there had been one well-marked hæmorrhage modern opinion was strongly in favour of terminating the pregnancy without delay. Given a patient who was not in labour and who had an uninfected genital canal, Cæsarean section by a man accustomed to abdominal surgery was strongly recommended. He quoted three cases in which on one a woman, who had a severe attack of flooding, had been treated expectantly, and a second attack of flooding had proved fatal before she could be delivered by version. In two other cases, after the first hæmorrhage he had performed Cæsarean section and had saved both mothers and children. He recommended that such cases should be transferred to nursing home or hospital after the first hæmorrhage for treatment by hysterotomy. He did not say that all cases of placenta prævia should be treated by Cæsarean section, and many would still be treated by version, but he strongly insisted on the importance of waiting after version had been performed till the uterus expelled the child by natural efforts.—The President showed three original photographs taken by Captain Shearer, R.A.M.C., by his method of depicting organs *in situ* in the living body: (1) Brain and medulla, (2) brain showing hæmorrhage into arachnoid and cerebral abscess, (3) normal intestines.—Mr. G. C. Hayes showed some cases of inoperable malignant disease which had been treated with diathermy with considerable benefit.—Mr. J. F. Dobson and Dr. J. Stewart showed a patient for whom an ileocolostomy was performed three years ago for advanced rheumatoid arthritis.—Specimens were shown by Mr. L. R. Braithwaite and Mr. A. Gough, and microscopic slides by Dr. C. W. Vining, Dr. M. J. Stewart, and Dr. W. H. M. Telling.

DORSET COUNTY COUNCIL AND VENEREAL DISEASE.—At the last quarterly meeting of the Dorset county council it was decided to establish treatment centres for venereal disease in six towns, and Mr. W. B. Cosens, with Dr. T. Howard, both of whom are magistrates, will assist the council in the scheme.

there any evidence of a co-existent intestinal toxæmia. Wounded soldiers were not especially liable to nephritis. It had been suggested that the nephritis was a complication of an epidemic of a suppressed form of scarlet fever, and the comparative freedom of the Indian troops, who are immune to that infection, was cited in evidence, as well as the occurrence of sore-throat at the beginning of the attack. A history of early sore-throat was obtained in 27 per cent. of his cases, but he regarded it as secondary to the cough. There were many points of similarity between scarlatinal nephritis and this form, but such a view would mean that there had been 10,000 cases of scarlet fever, all suppressed, and all free from desquamation, which seemed impossible. A previous history of nephritis was obtained in 13 only, so it could hardly be due to recrudescence of former nephritis. Nor was antityphoid inoculation the cause, for nephritis had not occurred in a similar manner among the troops at home or in South Africa. That the condition was due to a specific infection was suggested by the fever at the onset and preceding relapses, the spread to the French troops four months after its occurrence among the English and to the Mediterranean area when troops were transferred there from France. Its patchy distribution also resembled that of cerebro-spinal fever. The results of post-mortem examinations pointed to an involvement of the glomeruli and tubules, as in an infective nephritis. Examination of the urine, however, had afforded little support to this view, for of 21 examined bacteriologically 18 were sterile. Blood cultures were also sterile. Various organisms had been isolated from the throats of affected patients, but not more frequently or in greater numbers than among controls, and antibodies to these organisms were not found in excess in the blood. In two cases, however, Dr. Mackenzie Wallis had been able to reproduce albuminuria in rabbits by inoculating them with the urine of affected persons, and this after an incubation period of eight days, which corresponded approximately with the incubation period as estimated clinically. His investigations suggested that the infective agent was ultra-microscopic and filter-passing. A positive Wassermann reaction was obtained in 18 out of 56 cases examined; this might mean a corresponding incidence of syphilis, or, on the other hand, be due to another animal infection such as that by a filter-passing organism was supposed to be. Considering next the symptoms of the disease, he said that the incubation period was between 6 and 15 days. Premonitory symptoms, according to Captain Abercrombie, were met with in about half the cases, and were bronchitic, febrile, or abdominal (pain and vomiting). Œdema was usually the first symptom noticed, and was present in 97 per cent. of the cases, but generally lasted only a few days and was not often considerable. Early dyspnœa was noticed in 76 per cent., starting usually at the same time as the œdema, but ceasing sooner. It would appear from estimations of the alveolar air that the dyspnœa was not always associated with acidosis, uræmic or otherwise, and was possibly explained by a similar effusion into the lungs. He had not observed the wide fluctuations of the blood pressure described by Abercrombie. The commonest systolic pressure was 140 mm., and there were but few patients with a really high pressure, and these were men who had been painters or plumbers in civil life. The difference between the systolic and diastolic pressures was very considerable, being about 10 c.mm. Hg. These findings would account for the fact that cardiac hypertrophy and arterial changes were little evident. The urine was often much increased in amount, even in the acute cases. Red blood cells were seen in it in 102 of the 166 cases and white corpuscles in 79. A flocculent reddish-brown precipitate containing blood elements was commonly met with. Casts were found in the majority. There were blood casts in 2, epithelial in 37, fatty in 7, granular in 73, hyaline in 58. Retinal changes occurred in 18 per cent. and convulsions in 4 per cent., but these generally yielded quickly to venesection. As occasional symptoms were herpes and parotitis, suggesting an infective origin. Milkiness of the blood serum was not found in any of the specimens withdrawn for the Wassermann reaction except in one fatal case. Two cases only out of the 166 were fatal; in the majority the patient felt well when the œdema had subsided. The albuminuria was intermittent, and often relapsed, ceasing after a period of from 14 weeks to 5 or 6 months. Recovery might be complete after a long period of albuminuria. He considered that all soldiers who had suffered from nephritis should be regarded as unfit for foreign service, and if the albuminuria persisted for more than four months should be discharged. The diastase output must have returned to normal before a cure could be said to have been established. As treatment he recommended a low nitrogenous diet during the acute stages, but one containing considerable variety. The diet suggested contained 43 grm. of protein, 285 grm. of carbohydrate, and 50 grm. of fat, with a total calorie value of 1815. When the acute stage was over this might be replaced by an ordinary nitrogenous diet, including mutton or fish, and might contain as much as 95 grm. of protein, the total calorie value being 2690. His experience with theocine had been unsatisfactory, the drug appearing to act as a renal irritant as well as a diuretic and being unsuitable in acute cases. The same was true of diuretin. It was impracticable to flush out the kidneys in acute nephritis, but there was a risk in diminishing the intake too much. Hot-air baths had definite limitations; they were only useful if followed by diuresis. For hæmaturia he found no drug of certain value. With dry cupping his experience had been unfortunate. Venesection was valuable for cases not doing well and most efficacious for convulsions.

Lieutenant W. H. DUNN, R.A.M.C., recounted his clinical experience of nephritis in France in the casualty clearing station zone. No composite picture of the symptoms could be drawn, but a fairly clear group could be selected as characteristic. The patients had the appearance of health, showing little anæmia or loss of flesh. Dyspnœa was very common, but not urgent. The urine was usually considerable in amount and seldom diminished. The amount of albumin was usually 2–4 parts per 1000, but in some cases was 8 parts per 1000, and higher figures had been met with. In spite of this the urine was clear and was not smoky. The casts were commonly hyaline and epithelial; blood casts were uncommon. Rapid improvement was the rule. There was usually no fever. In some cases blood was passed in considerable amount; then fever was often associated. He was at a loss to assign any general cause. Against an infective process, like scarlet fever, was the fact that although the troops were in close contact with civilians the latter were unaffected. There was nothing to support the view that the ground was infective in particular areas. He had studied the pathological anatomy in 24 cases in all, of which 17 acute cases and 2 subacute cases were of the kind of nephritis under discussion. Little could be detected by the naked eye, except that on the cut surface of the cortex the glomeruli projected slightly as grey translucent nodules, not as red nodules, such as were seen in ordinary acute nephritis. Microscopically, catarrhal changes in the tubules were indicated chiefly by degeneration of cells; fatty changes were seen in some cells. Tubular hæmorrhages occasionally appeared. The main changes were found in the glomeruli. They were enlarged, and often pouted into the tubules, their cell content being increased. Desquamation of the covering epithelium was sometimes present. The vascularity was diminished. The capillaries were dilated, and contained abnormal nucleated cells. There was little evidence of reaction or degeneration Proliferation of the epithelium was met with. In two cases total infarction of the tufts was found, due to occlusion of the afferent arterioles. These changes corresponded closely with the book descriptions of glomerular nephritis, and were therefore not new. Special examination of the organs had failed to give any evidence of a bacterial cause. The lungs in one case were found to be acutely emphysematous and œdematous and to contain diffuse patchy hæmorrhages. The spleen also was the site of numerous small hæmorrhages and was slightly enlarged. Similar hæmorrhages were found in the brain. Detailed examination of the lungs showed a peculiar lesion of the walls of the infundibula and ends of the bronchioles. These were prominent and covered by dense fibrin, and had the appearance of having been cauterised. The changes found resembled those following the inhalation of Cl_2 or other irritant gases. The large bronchi showed a similar condition. In two other cases like changes were found, and in four others lesions showing a comparable but not identical change. In six out of the seven there was evidence of thrombosis of the capillaries in relation to the infundibular damage. Hæmorrhages occurred in the spleen and brain in two cases and were apparently embolic in origin. It

seemed that in many there was a process of multiple embolism in being, and this suggested that the kidney lesion was similarly caused, but no thrombi had been found in the glomeruli. In shell-gas poisoning the lung condition was very similar, and thrombosis of the pulmonary capillaries and cerebral hæmorrhages of embolic origin also occurred. In one case the kidney contained thrombi in the glomerular capillaries; in others there were no thrombi there, but proliferation of the endothelium. It was possible that thrombi had previously been present. Although it was not suggested that the nature of the irritant inhaled was drift gas or shell gas, it seemed clear that the origin of this form of nephritis was to be found in capillary embolism, and it might be in emboli derived from the lung lesion, which was of the kind recognised as due to an inhaled irritant.

Mr. W. H. JESSOP said that of 75 cases he had found that 71 per cent. had retinœdema with the occurrence of plaques and sometimes of detachment of the retina. There were few hæmorrhages. 57 per cent. of the patients were between 20 and 30 years old. The vessels were unaffected and the blood pressure was normal. All these changes could be watched from time to time and be seen to disappear. He could not but conclude that they were due to toxæmia, as also was the œdema elsewhere.

Mr. J. E. ADLER said that he had met with blood casts on several occasions. He regarded the diastase test as of the utmost value. In acute nephritis there was generally a low diastase reading. In 800 readings it varied from nil to 40. In the majority of cases a diastase value consistently low was evidence of low renal efficiency. Of 69 cases with a low diastase value, 31 showed blood in the urine and 38 no blood; occasionally blood was found with a high diastase reading. The phthalein test was the most valuable. To perform this 6·6 mgm. of phthalein was injected intramuscularly and the bladder emptied 1 hour and 10 minutes later, and every hour up to 3 or 4 hours. The test depended upon the amount excreted at the different hours. The amount excreted during the first hour should equal the total of the amounts passed at the end of the second and third hours. It agreed with the diastase readings in showing that the permeability of the renal cells was markedly decreased in nephritis, and it also indicated the advent of uræmia. The diastase readings and the phthalein test results were generally in agreement, but there were instances when the test was more reliable than the diastase values. The disadvantages of the diastase test were that a 24 hours' specimen was necessary, the readings were variable, much time and special apparatus were required, and the starch had to be made fresh every day. Its use necessitated laboratory work. He thought that both tests should be carried out in every case to enable a decision to be arrived at as to what should be done with the patients.

ROYAL SOCIETY OF MEDICINE.

SECTION OF DERMATOLOGY.

Exhibition of Cases.

A MEETING of this section was held on Oct. 19th, Dr. J. H. STOWERS, the President, being in the chair.

The following cases were shown.

Surgeon D. LOUGHLIN, R.N. (for Dr. H. BATTY SHAW): Case of Leukæmia Cutis. The patient was a man aged 37. Purple-coloured patches first appeared on his body eight months ago. Three months later an ulcer developed over the sacrum, and within another month lumps, which have gradually been getting bigger since, appeared in the skin of the trunk, limbs, and face. The patient was ill, febrile (temperature 101°–102° F.), and had the leonine facies typical of the condition. The lymphatic glands were not enlarged, and neither the liver nor the spleen could be felt. The blood count showed a diminution of red cells, some of which exhibited vacuolation and poikilocytosis; also macrocytes and microcytes were seen. The white cells were absolutely decreased, but there was a relative increase of lymphocytes. The histological specimen showed the typical infiltration of the tissues with lymphocytes.—Dr. F. PARKES WEBER recorded a somewhat similar case, which had been published under the name of Granuloma Fungoides.—The PRESIDENT referred to another case similar to the one shown exhibited by Dr. Lidiard at the first meeting of the Clinical Section.

Dr. H. G. ADAMSON showed, amongst others, a case of Schamberg's Disease. The patient was a man who had a chronic punctate inflammatory condition of the skin on one shin. When the lesions disappeared they left pigmented marks.

Dr. A. WHITFIELD: Cases of Pruritic Dermatitis caused by infection of mange from a kitten. The lesions differed from those of ordinary scabies, as they were small papules surrounded by an oval zone of erythema, and in some instances surmounted by a minute pin-head-sized vesicle looking not unlike a varicella papule. The lesions were generalised, but the fingers and wrists were free. In the kitten the acarus and a run, including eggs and fæces, were found in some scales removed from the skin behind the ears.

Dr. J. H. SEQUEIRA showed, amongst others, a case of Erythræmia in a man aged 28.

Dr. S. E. DORE showed a case of Localised Sweating of the Face and Hydrocystoma.

Dr. PARKES WEBER: Case of so-called Multiple Pigment Sarcoma of Kaposi. The patient was a Russian Pole, 26 years of age, who came to England when he was 1 year old. The disease began two years ago on the left hand. Microscopically the lesions were typical—i.e., the most prominent feature was the large quantity of thin-walled blood-vessels surrounded by a number of fibroblasts.

The PRESIDENT exhibited a case of Circumscribed Sclerodermia (Morphœa) in a girl, aged 7 years, of extremely nervous disposition. The child of healthy parents, she was stated to have developed the disorder a few weeks after being suddenly awakened at midnight by a bomb explosion one year ago.

An abstract of a paper on Acnitis in an Egyptian soldier was communicated by Dr. A. G. CHALMERS and Dr. J. MARTYN, and illustrations were exhibited.

LEEDS AND WEST RIDING MEDICO-CHIRURGICAL SOCIETY.—The first meeting of the session was held at the Leeds General Infirmary on Oct. 27th, Mr. W. R. Bates, the President, being in the chair.—The President gave some notes of cases that he had had the opportunity of observing over a long period. The cases described were of considerable clinical variety, and showed how uncertain was the element of prognosis.—Professor J. B. Hellier read a paper on the Treatment of Placenta Prævia, in which he discussed the place of Cæsarean section in dealing with this condition. He said that when there had been one well-marked hæmorrhage modern opinio was strongly in favour of terminating the pregnanc ithout delay. Given a patient who was not in l and who had an uninfected genital canal, Cæsa on by a man accustomed to abdominal surgery m strongly recommended. He quoted three cases in n one a woman, who had a severe attack of flooding, een treated expectantly, and a second attack of flooding had proved fatal before she could be delivered by version. In two other cases, after the first hæmorrhage he had performed Cæsarean section and had saved both mothers and children. He recommended that such cases should be transferred to nursing home or hospital after the first hæmorrhage for treatment by hysterotomy. He did not say that all cases of placenta prævia should be treated by Cæsarean section, and many would still be treated by version, but he strongly insisted on the importance of waiting after version had been performed till the uterus expelled the child by natural efforts.—The President showed three original photographs taken by Captain Shearer, R.A.M.C., by his method of depicting organs *in situ* in the living body: (1) Brain and medulla, (2) brain showing hæmorrhage into arachnoid and cerebral abscess, (3) normal intestines.—Mr. G. C. Hayes showed some cases of inoperable malignant disease which had been treated with diathermy with considerable benefit.—Mr. J. F. Dobson and Dr. J. Stewart showed a patient for whom an ileocolostomy was performed three years ago for advanced rheumatoid arthritis.—Specimens were shown by Mr. L. R. Braithwaite and Mr. A. Gough, and microscopic slides by Dr. C. W. Vining, Dr. M. J. Stewart, and Dr. W. H. M. Telling.

DORSET COUNTY COUNCIL AND VENEREAL DISEASE.—At the last quarterly meeting of the Dorset county council it was decided to establish treatment centres for venereal disease in six towns, and Mr. W. B. Cosens, with Dr. T. Howard, both of whom are magistrates, will assist the council in the scheme.

Reviews and Notices of Books.

Traitement des Fractures: Fractures Articulaires.

Par R. LERICHE, Professeur Agrégé à la Faculté de Médecine de Lyons. Avec 97 figures dans le texte. Paris: Masson et Cie. 1916. Pp. 190.

IT is a curious fact that before the war more German text-books in medicine and the allied sciences were read in this country than books written in French, though it is certain that many more medical men in the British Isles can read French than German. It is difficult to explain this fact. It is not through any lack of French medical literature, for the French press is prolific in medical works. Perhaps the explanation is to be found in the idea that the profession in Germany was more thorough in its methods than in any other country. Be this as it may, the advent of the war has directed the attention of British medical men to the medical literature written in the French language; and the interest felt in French works on medicine and surgery is increased by the fact that the war has given rise to no small number of books on matters directly connected with the war. Among these new books are some composing a series of war-books of which we have a specimen before us, written by a surgeon well versed in the matter which he discusses. He has spent no space on mere theoretical discussions, but has gone straight to the point, and has described his own methods of practice based on his own experience, and thus we have a much more valuable and interesting work than if we had merely a résumé of current opinions.

Professor Leriche deals with fractures involving joints under two sections—the first comprising the general principles and the second describing the treatment of fractures involving special joints. In connexion with the recent discussion in this country on the relative merits of a number of antiseptics in the treatment of wounds received in war, it is of interest to note that Professor Leriche does not approve of the use of any antiseptic whatever, but he puts the greatest stress on laying the wound completely open, even to its uttermost recesses, and this, in his opinion, is the most efficacious method of overcoming the microbic infection of wounds. He also values greatly the exposure of wounds to the sunshine, for he has found that the sun has a very definite action on the healing of wounds and that also it preserves the tonicity of the muscles, so that when the patients come for them to act again they are in the best condition to resume their work. Unfortunately for the use of this agent, sunshine is not so available as might be desired.

In the section dealing with the individual forms of fractures into joints we need say little more than that Professor Leriche has in the case of each joint described the anatomical types of the fracture involving it, the immediate treatment, the indications necessary for a good functional result, and the post-operative treatment. The book contains a large number of excellent illustrations, many of which are reproductions of skiagrams. It cannot fail to prove of great value to those who have to deal with the almost innumerable cases of fractures into joints encountered in the present war.

Food and the Principles of Dietetics.

By ROBERT HUTCHISON, M.D. Edin., F.R.C.P. Lond. With plates and diagrams. Fourth edition. London: Edward Arnold. 1916. Pp. 617. Price 16*s.* net.

THE real appreciation of this book is seen in the issue of a fourth edition since it was published in 1900. With a wide public it has been accepted as an authoritative work on general dietetics. It is eminently practical in character, and one of its especial features is the discussion of well-known foods and beverages, proprietary and otherwise. In many instances the author has supplied in regard to these his own analytical data, while he acknowledges much work on the analyses of foods and similar subjects which has been reported from time to time from THE LANCET Laboratory. The significance of chemical results receives adequate treatment; the author states that it is not entirely chemical composition that decides on actual assimilation and appropriation of the elements of food for the body's needs, while he points out that we often pay a fabulous price for the mere æsthetic qualities of food. He has added in the new edition a chapter on the vitamines, the presence of which in certain foods may, he admits, have to modify our views as to their dietetic merits. This subject is necessarily a difficult one to discuss in all its aspects at the present moment, and in some places the teaching may appear to have fallen behind, and in a few cases some of the proprietary preparations dealt with are no longer extant.

The book continues to be one of the most useful sources of reference on food and dietetics, and the discussion of principles is thoroughly sound. We are glad to note that some errors in the index of the previous edition have been rectified.

New Inventions.

AN IMPROVED GAG.

THE accompanying illustrations represent a gag (Fig. 1) which I have found invaluable in treating the varying degrees of trismus so commonly met with in neglected jaw injuries and gunshot wounds of the face, with consequent cicatrisation. The gag in the closed position (Fig. 2) is 5/16 in. high; as the majority of patients needing treatment can open their mouths to this extent in the incisor region the insertion of it presents no difficulty, and it is surprising how quickly full range of mandibular movement is acquired. I have found this gag absolutely indispensable in inserting the open-bite Gunning splint, the particular type of splint which I have employed with marked success in treating the severer cases of jaw injuries. Another advantage of this gag is that it can be easily manipulated by the patient and can be retained for two or more hours at a time, the range of movement being gradually increased by an occasional turn of the key.

FIG. 1.

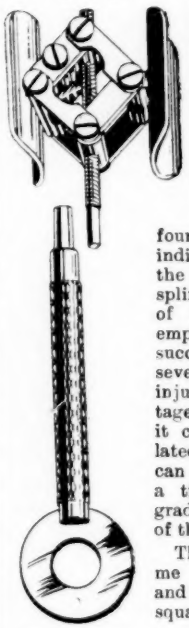


FIG. 2.

The instrument has been made for me by Messrs. Claudius Ash, Sons, and Co., Limited, Broad-street, Golden-square, London, W.

Burlington-gardens, W. CHAS. H. BUBB, L.D.S. Eng.

AN IMPROVED ARTIFICIAL LEG.

WE have had exhibited to us an improved artificial leg which is made of leather, is therefore very light and has joints which work smoothly. Unlike the wooden bucket, the leather bucket, which is used in this instrument, can be easily made to fit the stump by simple lacing and is always under the control of the man who wears it and who, naturally, knows best what is most comfortable. In the "Ipswich leg" the upper bucket has a natural knee formation and works closely inside the top of the lower bucket, while the movement of the foot approximates very fairly to that in the natural limb. The action of the ankle-joint makes the mounting of stairs and curbs easy, and it is stated that even with amputation above the knee a cycle can be ridden with comfort. The leg is attached to the body by a special brace passing over both shoulders and equally dividing the weight. The weight of the instrument is 5¾ to 7½ lb., and most of the repairs that are likely to be required can be executed by any saddler or cobbler. Mr. J. F. C. Hossack, F.R.C.S. Edin., writes that he has a favourable experience with this artificial leg.

The makers are Messrs. Griss and Smith, of 52 and 54, Fore-street, St. Clement's, Ipswich.

THE LANCET.

LONDON: SATURDAY, NOVEMBER 18, 1916.

The Problem of the Disabled Soldier.

THE problem of the disabled soldier remains to a great extent undealt with, although we are aware that it is receiving the anxious attention of some of our best thinkers and organisers. In the debate in the House of Commons on Tuesday night, upon the introduction by Mr. ARTHUR HENDERSON of the Bill to establish a new Pensions Board, the magnitude of the difficulty was seen to be apparent to Members, and it must be earnestly hoped that no further delays in action will take place. Seven weeks ago we noticed a Memorandum dealing with the matter from the Committee of Reference of the English Royal Colleges; this stated that the medical aspects of the question were so important as to render advisable an immediate inquiry into the subject by experts, both civil and military. The Committee of Reference has worked in association with the Central Medical War Committee, and the Central Medical War Committee concluded some time ago that the matter was becoming urgent because the difficulties of dealing with disabled soldiers, bad enough at the moment, must grow more serious with the rapid and even daily increase of their numbers.

There are already at the lowest estimate 50,000 disabled soldiers discharged from the military hospitals as unfitted for further service, many of whom might have been enormously benefited by the continuance of such medical, surgical, and special attention as is received while remaining in the Army. The economical view under which they are now being discharged can only be justified if all that is possible is done for them, so that removal from the Army does not imply the reduction of them to civilian inutility. They would, of course, have been retained in the Army had it been considered possible to refit them for active service, but this event appearing to be out of the question, they were discharged. A certain proportion of them must in all circumstances prove unfit to conduct any business in civil life or to become wage-earners or independent citizens; but this proportion can be substantially diminished by the provision of treatment directed to their individual cases, particularly if this is made available for some considerable period. True national economy, just as much as special gratitude or common humanity, indicates that some such course should be pursued, and pursued quickly. A recent statement made by Mr. J. M. HOGGE, M.P., while emphasising the necessity which all recognise of making a quick start in the work, suggested that the Army should keep the men who were injured or disabled until such time as they were fit to be discharged, one of his principal justifications for this course being the fact that the military hospitals have already absorbed so much of the medical skill of the country. The Committee of Reference of the English Royal Colleges have also pointed out that a large proportion of the specialists in the medical profession were holding commissions, so that while the disabled soldiers remained in a military hospital, depôt, or camp their condition could be supervised by those best qualified to secure satisfactory results, whereas on discharge their treatment was complicated by the absence from civilian duty of those whose advice would be naturally sought. In these circumstances, the great majority of the men being discharged into civil life, the National Health Insurance Commission becomes gravely concerned with the problem of the disabled soldier. When an insured person enlists he automatically comes off his panel, but on discharge from the Army he returns to the panel, and in the majority of cases will be restored to his former doctor's list. Abnormal work is thus thrown upon the panel practitioner, and there is as yet no systematic provision of consultants or specialists who can relieve him of any part of his responsibility or undertake duties which are without his province. These various aspects of the case are now under the consideration of the Secretary of State for War, who is in possession of the views of the Central Medical War Committee and of the War Pensions Statutory Committee on the subject, as well as of the valuable Memorandum of the Committee of Reference of the Royal Colleges. It is earnestly to be hoped that some general and generous plan of discharging the duty of the nation towards the disabled in the war will be set in motion.

The new Pensions Board, whose institution was made public in Parliament this week, has for its task the reconstruction of the administrative machinery for war pensions and comes, therefore, into close contact with the problem of the disabled soldier. For the pension of the disabled soldier, however promptly handed out, cannot be expected to pay for a long course of special surgical or medical treatment. The defined object of the new Board is to perfect a pension scheme, and the War Pensions Statutory Committee will retain power to make provision for the care of disabled soldiers in respect of their health, after-care, training, and employment. Much of the admirable work which has been carried on by the voluntary committees will therefore be continued. But the medical profession would like to know with some approach to certainty what is the intended procedure. The terms of panel practice were not devised to cover the cases of disabled soldiers; yet the best that can be done for these brave men must be done. If their care falls upon the panel practitioner the best adjuncts to treatment will have to be found, whether we mean here the service of specialists, the provision of institutions, or the discipline which authority gives and under which systematic therapeutics thrive. There must be some men discharged into civil life, but from now on, it seems to us, a different policy should be pursued, and the majority of our disabled soldiers

should be retained with the Army until they are in great measure fit to conduct the battle of civil life. This is the strong feeling of an influential section of the public. Military administration naturally recognises the difficulties of this course, and we should be blind not to do so also. But in Sir ALFRED KEOGH we possess an extraordinarily sympathetic as well as able Director of the Army Medical Service, so that we can feel assured that the cause of the disabled soldier will be treated as a matter of the gravest national importance. Prompt action before the present situation becomes hopelessly aggravated ought to follow upon the deliberation of well-informed persons, commonly inspired with a desire to do their best to restore our disabled men to the highest possible grade of health and earning power.

Pain and Muscular Action.

THE problem of the nature and meaning of pain is as old as the hills. Words expressing pain are found in all languages, and in languages having a common origin the word for pain is etymologically the same. No satisfactory definition of pain has ever been given: the metaphysical interpretations of other days have now only a historical interest, while more modern views are not always free of the implication that they are definitions which do not define. In fact, a body of thoughtful opinion now supports the contention that there is no such thing as a pain-sensation—i.e., that pains (and pleasures, too, for that matter) are not sensations on the same level as, say, sensations of touch. It is held that pain is an affective element accompanying sensation, and depending on its quality, its intensity, and its duration, for the particular effect which it produces in consciousness. The pain of a cut or burn, for instance, it is said, can be analysed into a tactile or a temperature sensation on the one hand, and a feeling of displeasure on the other. Were pain a sensation in the accepted sense, it would be difficult to explain how a sensation originally unpleasant may lose its unpleasant character by repetition, or even, eventually, become pleasant, as in the case of "acquired tastes." Pleasures and pains are mental facts accompanying simple sensations, and are the expression of different physiological effects produced or aroused by the stimulus. This is equally true at higher levels of mental life; the "pain" of a blow on the shin and the "pain" of a bereavement differ in mental quality. It may be replied with truth, no doubt, that the question of specific pain-sensations is largely one, not of psychological, but of physiological and pathological evidence, and that the apparently clear separation, in the skin, of pain from other cutaneous sensations, and its apparently independent peripheral mechanism, militate against the hypothesis that pain is only a qualifying factor in sensation.

From quite another point of view pain has been regarded as "a beneficent reaction of the nervous system against threatening forces"; in its teleological aspect it is considered to be "a grouping of disagreeable stimulations for the purpose of communicating the existence of an injury to consciousness." One of the most recent contributions to the problem of pain from the biological or evolutionary standpoint comes from the pen of Dr. GEORGE W. CRILE, of Cleveland, the high quality of whose original researches on shock and allied states has been widely acknowledged. Dr. CRILE has expressed his views in his book on "The Origin and Nature of the Emotions" and again in his more recently published work, "A Mechanistic View of War and Peace." According to this writer, pain is one of the phenomena which result from a stimulation to motor action, and he goes so far as to assert that "without some associated muscular action there is no pain." His general argument is that the phylogenetic purpose of pain is to bring about appropriate muscular action, whereby the injuring stimulus or stimuli are counteracted. Illustrative instances readily suggest themselves—a foreign body on the conjunctiva or cornea and the associated pain and reflex phenomena, the nausea that precedes vomiting, the pain of stepping with the bare foot on a sharp stone, the discomfort of bladder overdistension. Going somewhat further, Dr. CRILE next asserts that the exanthemata are painless and pyogenic infections painful because the protective response of the body to the former is mainly chemical, whereas in the case of the latter an attempt is made to prevent the spread of infection from the original focus by immobilisation of muscles whose contractions would serve to diffuse the infection—a protective muscular rigidity, which is painful. On the other hand, should the pyogenic infection be situated in organs or viscera in which muscular action can play no part in restricting it, such protective muscular action, and pain, do not occur. "This explains why tuberculosis of the hip is painful, while tuberculosis of the lung is painless." Only those parts of the body that have been exposed to injurious contacts with environment are supplied with pain receptors, hence many intracerebral pathological conditions are, according to Dr. CRILE, entirely painless. As, in this view, the emotions are as purely motor excitants as pain, it is supposed that there may be a conflict between physical and psychical stimuli for the possession of the "final common path," and the assertion is made that psychical stimuli occasion a more rapid release of energy; hence they obtain possession of the path, and pain cannot be felt until the emotional excitation dies away. In the fury of battle the soldier may not perceive the pain of a wound because emotion holds the final common path, so that muscular action is for the time being prevented.

Yet the soldier is far from being always in a state of emotional overaction when he happens to be wounded, so Dr. CRILE argues that should a high-velocity projectile pierce his body at such a time no pain is felt because "the high-speed bullet is a recent development," and the "sense organs have not become adapted" to its stimuli, hence they cannot react. As a fact, however, a number of cases of instantaneous pain, in a limb, say, from injuries by rifle or machine-gun bullets have occurred in the

war, where the pain has been agonising and continuous, and where irritation of a mixed or sensory nerve has been the cause. No muscular action, by immobilisation or the reverse, makes any difference to the pain, nor does the pain lead to any particular muscular action. Again, certain pathological intracerebral conditions, in particular lesions of the optic thalamus, are not infrequently associated with unbearable pains, referred to the contralateral limbs, trunk, or face, yet the optic thalamus has never, phylogenetically, been exposed to "injurious contacts with environment." Dr. CRILE further asserts that if the kinetic system is so completely exhausted that no more muscular action can be excited pain is impossible. That pain exhausts the sufferer, and that with absolute exhaustion sometimes comes relief, is of course a truism; but another interpretation is surely valid—viz., that it is the exhaustion of the afferent, not the efferent, mechanism or linked neuronic systems from over-stimulation which leads to the cessation of the pain, as too bright a light blinds, too loud a sound deafens. Dr. CRILE'S generalisations are very suggestive, and a perusal of his two works above mentioned, as well as of a third, "The Kinetic Drive," cannot fail to interest the reader. If we are not inclined to subscribe to all his contentions, we are grateful to him for his persistent efforts to seek an adequate physical basis for phenomena whose investigation used to be left too often to the metaphysician.

THE BELGIAN DOCTORS' AND PHARMACISTS' RELIEF FUND.

SUBSCRIPTIONS.

THE following additional subscriptions to the Fund have been received:—

	£	s.	d.
Dr. G. D. H. Carpenter (16th and 17th donations—total, £17)	2	0	0
New South Wales B.M.A. (per Dr. Crago, honorary treasurer) (total, £826 19s.), Queensland Branch	34	16	0
Fund initiated by Otago Division of New Zealand Branch of B.M.A. (second donation—total, £1012 15s. 2d.):—Medical Men in Otago chiefly, but many from other parts of New Zealand; Pharmacists of Otago and South Canterbury; Nurses in Otago; Otago Catholic Association and General Public	407	15	2

Subscriptions to the Fund should be sent to the treasurer of the Fund, Dr. H. A. Des Vœux, at 14, Buckingham Gate, London, S.W., and should be made payable to the Belgian Doctors' and Pharmacists' Relief Fund, crossed Lloyds Bank, Limited.

THE APPEAL FOR SURGICAL INSTRUMENTS.

Surgical instruments should be sent to the Master of the Society of Apothecaries, Apothecaries' Hall, Blackfriars, E.C.

ACUTE ANTERIOR POLIOMYELITIS IN IRELAND.—Unfortunately, cases of acute anterior poliomyelitis, at least 60 to 70, have occurred recently in different districts of Ireland. It is known that 9 cases have been diagnosed in and about Bailieborough (co. Cavan), 3 or 4 in Carrickmacross (co. Monaghan), 3 in Newry, 12 about Castlerea (co. Roscommon); 7 cases have been notified in Belfast, and 6 are now in Purdysburn Fever Hospital, while cases have also been met with in Holywood, Ballymena (co. Antrim), and in Markethill (co. Armagh), as well as in other districts. One of the characteristics of several of the cases has been the rather late appearance of paralysis, which has occurred a week after the onset of the feverish attack, naturally leading at times to a deferred recognition of this serious disease. Apparently, treatment has not had much effect.

Annotations.

"Ne quid nimis."

WOMEN AND THE LAND.

BEFORE the war the employment of women as workers on the land had become so much less usual than it was two or three generations ago, or had so completely ceased, that the present demand for their services found few able to respond to it. The women agricultural labourers in France and other continental countries continued and added to their daily toil on farms; our women were not ready to do likewise in any large numbers. Those whose grandmothers used to labour in our fields thought farm work "lowering," or regarded it as over-arduous, and, moreover, had acquired no training or experience to fit them for it. In these circumstances the sudden and urgent demand produced a supply of unsuitable persons from towns and villages, for the Women's Farm and Garden Union was practically the only existing institution which had interested itself in women's work on the land in time of peace and did not possess the means to meet a large demand. But a Women's National Land Service Corps, a war offshoot of the above society, was started to deal with the problem of meeting the immediate needs of the farmers. We commend the study of this body's interim report (which is published at the headquarters of the National Land Service Corps, 50, Upper Baker-street, London, N.W.) to women with physical and mental health and strength, who are anxious to do work very important in character and most helpful to our military cause, and who are not "out for money." Women workers on the land and organisers of such work are not paid at the rates expected by munition workers, or by the more highly rated employees of the War Office and the Admiralty, and their life will not be as exciting as that of the motor-car drivers who face danger and hardship near the front, but, nevertheless, they will be doing patriotic work, the need for which can hardly be exaggerated. Much of the work on any farm is well within the physical capacity of women. Milking and most of the duties connected with the care of animals may be taken as examples. But it is not only on account of the direct usefulness of the physical work to be done that the Women's National Land Service Corps should appeal to women. It can, indeed, supply training for a short period to women which will send them to a farm not quite in the position of raw hands, and it will thus test the suitability of the work to their capacity and temperament. It has, however, also as its object the supply of women to country districts who, besides doing their task for the farmer employing them, will help in the recruiting of other women, in organising the labour of village women, and in encouraging them by example to come forward. It has among its stated aims the supplying of county committees with organisers and trained speakers. It will be interesting to see how far women who entered upon farm work to meet an emergency will devote themselves after the war to an industry to any large extent which for several generations has possessed no feminine appeal. They will have found, or probably will have been able to introduce, better conditions than those which prevailed in the "old days." They will also be qualified to express opinions in the future when

educational questions as affecting country districts are reopened and when measures are being discussed for ensuring the return to the land of a larger proportion of our population.

HEAT STROKE, AVOIDABLE AND UNAVOIDABLE.

THE tragedy in the troop train from Karachi to Simla in June last, which was described at the time in our columns, came up again recently at question time in the House of Commons when it was stated on behalf of Mr. Chamberlain that no report of the inquiry was to be published. The statement was made that the Government of India have now issued revised regulations regarding the despatch of troops by rail during the hot weather, which should prevent the recurrence of such a tragic incident. In the face of this reassuring statement we are in entire agreement as to the uselessness of publishing details and of pillorying individuals who are now keenly alive to the possible dangers. The reply of the Secretary for State closes a chapter in preventable heat stroke. The 130 cases of heat-stroke which occurred on the *Dongola* during her voyage with wounded men from Basra to Bombay are in a different category. Seventeen deaths attributable to heat stroke occurred among the invalids and crew, and five others in which death was probably accelerated by the heat. The voyage was carried out under excessively difficult climatic conditions. On account of a following wind it was necessary during the early part of the voyage to put the boat about every four hours in order to get air into the wards. Here there appears to have been neither negligence nor ignorance; all that could be done in the trying circumstances was done, and the most regrettable fatalities were due to the fortune of war, and could have been neither foreseen nor prevented.

TICKLING COUGH.

Mr. T. Mark Hovell, President this year of the Laryngological Section of the Royal Society of Medicine, dispensing with a set presidential address, directed his introductory remarks to the therapy of certain common and distressing conditions of the upper air-passages, and especially to the relief of pain and discomfort. He agreed with Sir Richard Quain in ridiculing the idea that diseases of the throat are mostly of local origin, instancing many which arise from conditions existing below the diaphragm. Functional aphonia, granular pharyngitis, nasal obstruction connected with gastro-intestinal or uterine derangements, were instances of such association, and treatment must be directed accordingly. In regard to one especially distressing symptom Mr. Hovell was helpfully suggestive, and if he was right in his conjectures cases of tickling cough may frequently be relieved of their terrors. For this condition he describes a frequent cause and an efficient remedy. He says:—

> The cases of tickling cough which not only are very common after influenza, but which may follow a simple cold or occur without known cause, are frequently due to enlargement of the lingual tonsil, the cough apparently being produced by the swollen tissue coming into contact with the epiglottis. A solution of chloride of zinc, 15 to 30 grains to the oz., with a trace of dilute hydrochloric acid to thoroughly dissolve the salt, is in many cases sufficient to remove the trouble, but I am indebted to Mr. Morley Agar for calling my attention to the best remedy for this condition—namely, trichloracetic acid. A very small quantity of this drug only is required, and it is best applied on a wool-holder bent at a right angle, with only a very thin layer of wool attached to it, so as to ensure the quantity of acid being small. It is best applied with the aid of a mirror, so that it can be accurately placed on the swollen tissue. Enlargement of the lingual tonsil as a source of throat irritation, as far as I am aware, is not universally recognised, for if this were so the cases of paroxysmal cough which are so frequently met with would not be allowed to continue as they do.

In support of his contention Mr. Hovell cites a striking case of a lady of mature age who had for fifteen years been subject to violent paroxysms of cough, both by day and night, which began to lessen after the first application of trichloracetic acid, and became only occasional after continued treatment. Another case with a seven years' history of cough took a similar course. Mr. Hovell conjectures that the violent paroxysms of coughing in whooping-cough may also arise from enlargement of the lingual tonsil. In two patients in whom the cough was very persistent he found this to be the case, and appropriate treatment gave relief. He suggests to those who have to deal with whooping-cough a trial of this method, combined with the administration of garlic, which he is in the habit of applying by cutting the segments of the root into thin slices to be worn beneath the sole of the foot between two pairs of socks. Whooping-cough paroxysms do not readily yield to any remedy at present in use, and would therefore form a good test object for the value of these methods.

THE CLEAN WORKMAN.

IF the war lasts long enough and the Munition Workers' Committee continue their beneficent labours, industrial hygiene will reach a stage of development which might have required half a century of torpid peace conditions. The condition of the workman engaged in dirty employment and obliged to return home in his state of acquired grime is one that has long attracted the attention of thoughtful people as likely to result in loss of self-respect as well as the more or less marked aversion of his fellow travellers; but apart from trades in which the dust or dirt is poisonous, where the Home Office has been obliged to step in, little has been done to remedy the evil. Memorandum No. 14 (Cd. 8387, price 1*d.*) now deals with the provision of washing and bathing facilities for controlled factories in a way which should help to bring a drastic improvement. The Memorandum incidentally mentions a continental factory where hot and cold shower baths are provided for operatives engaged at sweaty or dusty processes and of which such free use is made that the workmen leave the premises spick and span. Attention is very rightly called to the practical impossibility of anything in the nature of evening recreation for the worker who must travel home, often a considerable distance, to get cleaned up before he can return to the city with his family. The installation of simple and practical lavatories is described in some detail, the suggestions being in the main identical with the regulations of the Home Office Order for pottery workers. In addition to such ordinary washing accommodation the Memorandum recommends the provision of bathing facilities for workers exposed to great heat and excessive dust. The cheapest and most efficacious installation is that of shower or douche baths, which produce not only cleanliness, but also a useful and stimulating effect upon the skin, militating against the catching of cold on leaving the workshops. The Memorandum suggests that workers may with advantage be encouraged to participate in the management of bathing facilities, and may

prefer in some cases to take a share of the payment. In workshops where baths are of special benefit to health and efficiency they should be provided within working hours. We trust the recommendations may be studied by employers and employed engaged in all dirty occupation, and that a result of this study may lead to a higher standard of personal cleanliness in the industrial world which will benefit health and self-respect alike.

TUBERCULOSIS OF THE TONGUE.

THOUGH tuberculosis of the tongue was described, probably for the first time, in 1767 by Morgagni in his work on the Seats and Causes of Diseases it is, like tuberculosis of other muscular tissues, very rare. In the *American Journal of the Medical Sciences* for September Dr. James R. Scott, microscopist of the Army Medical Museum, has published an important paper on the subject. After a thorough search of the literature he has been able to find only 231 cases. He has reported a case in a soldier, aged 32 years, one of a family of five, of whom a brother and a sister died from pulmonary tuberculosis. The patient dated his trouble from four years ago, when he noticed a small elevated white area on the left border of the tongue. He went to hospital, where touching with tincture of iodine twice a week was recommended. On examination he was found to be well nourished and muscular. After coughing fine moist râles were heard over the apex of the left lung. The temperature was normal. The tongue was slightly enlarged and corrugated. An ulcer, which had increased slowly and was not painful, occupied the posterior two-thirds. The sputum contained tubercle bacilli. A portion of the ulcerated area was removed for microscopic examination. Beneath the area denuded of epithelium were young fibroplastic cells, with here and there giant cells surrounding a small area of necrosis. Deeper in the tongue were numerous tubercles separating the muscular elements. Sections stained by the Ziehl-Neelsen method showed numerous acid-fast bacilli, some within the giant cells. The patient was admitted to a military hospital, where the fact was established that there was tuberculosis of both lungs. It is noteworthy that during the four years of the lesion of the tongue the chest was examined for tuberculosis with negative result, for he had twice enlisted, the first time three years and the second a few weeks before he came under observation. Tuberculosis of the tongue has been observed at all periods of life, but is most common in the decade 40–50. It is usually secondary to pulmonary tuberculosis and the result of an injury which causes solution of continuity of the mucosa, allowing inoculation of the sputum. Primary tuberculosis of the tongue is much rarer. With regard to the symptoms, the most striking feature is the indolence of the condition. At the onset there is little enlargement of the tongue or pain. The ulcer extends slowly. With the progress of the disease the tongue becomes considerably swollen and covered with glairy greyish mucus. Soon pain appears. At first it is felt only on taking solid food, but later is so intense that mastication becomes impossible; still later a liquid diet and even phonation cause excruciating pain. The tuberculous lesion is generally localised near the tip of the tongue, but may occur on the border or on the upper or lower surface. As a rule it begins as a small, slightly elevated nodule covered by normal mucosa. This rapidly breaks down in the centre to form an ulcer. The margin of the ulcer is generally abrupt and is frequently undermined. The surface is covered with sticky mucus. On removing this is revealed a grey or yellowish-red surface with hard round prominences suggesting granulation tissue. The treatment is difficult; the method most in favour is excision wide of the disease.

LACTIC BACTERIO-THERAPY IN MILITARY SURGERY.

IN the military hospital at Abano some interesting investigations of a preliminary character but which may lead to important results have been carried out by Captain Med. S. Patellani and Lieutenant Med. S. Colombino,[1] on the applicability of lactic acid fermentation to the treatment of wounds. From the outbreak of the war the laboratory for agrarian bacteriology at Crema supplied a reliable lactic ferment to several of the military hospitals, and Professor Ferrata had established the fact that by its use it was always possible to change the intestinal flora, substituting lactic bacilli for the pre-existing natural micro-organisms, and, further, that in acute intestinal affections, which are the true field of application of lactic bacterio-therapy in the digestive track, there was invariably a rapid fall of temperature and cure of the condition *pari passu* with the transformation of the intestinal flora. In applying these same means to the treatment of wounds it was at once found necessary to make a radical change of method. The bringing in contact with wounds of a culture-fluid of whey and peptone containing lactic ferments, in the hope that lactic fermentation would develop in such wounds, was found to be delusive and devoid of any definite results. In reality there are not present in a wound the conditions which render possible the development of a fermentation so delicate as that produced by lactic bacilli. Deficiency and fluctuation of the temperature would in themselves alone constitute a serious hindrance to the multiplication of the lactic bacilli, which need a constant temperature of 37°–38° C.; a rise of two or three degrees is sufficient to arrest the most promising fermentation. These difficulties could be overcome by using the culture-fluid already fermented, and a series of experiments were instituted to ascertain whether it were possible to keep muscular tissue from putrefaction by treating it in different ways with the products of lactic fermentation in a thermostat. It was proved that pieces of muscular tissue, when immersed for 30 minutes every 12 hours in whey and peptone previously fermented with lactic bacilli, remained entirely free from staphylococci. The process was then applied to wounds by baths, douches, and dressings, and it was found that it was possible to diminish rapidly the number of micro-organisms and at length to obtain an exudate free from them on direct microscopical examination. Further, the lactic bath or dressing had no deleterious action on the granulations, but, on the contrary, exerted a true cytophylactic action. In fact, wounds so treated became speedily free of necrotic parts, the granulations became active and the edges healthy, while cicatrisation was more rapid than that which took place with simple asepsis or the use of antiseptics. Similar experiments were repeated with the pieces of muscular

[1] Il Morgagni, Archivio No. 9, Sept. 30th, 1916. Milan: Via Ansonio 22.

tissue in the thermostat, using various antiseptics, such as tincture of iodine, peroxide solution, alcoholic and ethereal solution of iodoform, and Carrel's fluid. After the first 24 hours the tissues treated with the antiseptics were invaded by numerous micro-organisms, while those subjected to the lactic treatment were completely free from bacterial forms; they merely presented a growth of ordinary mycoderma, which always develops on a fluid containing lactic acid, forms similar to the saccharomycetes which, as is known, are harmless, having been used clinically against bacterial infections, especially intestinal. Finally it remained to be proved by what mechanism the lactic bath acted. Repeating the experiments with a solution of lactic acid of 1 per cent., being the same degree of acidity as the lactic bath, the presence of a vigorous growth of staphylococci showed that the efficacy of the lactic fluid used did not derive its antibacterial power solely from the lactic acid, but from this acid in conjunction with other substances elaborated by the bacillus which had grown in the culture-fluid. The problem deserves further study by all the chemical and biological means at our disposal. At present the research is essentially practical, and the experimenters have expressed their intention of formulating more precisely the indications for the use of this form of medication in the treatment of wounds.

THE FUTURE OF RADIOLOGY.

AN outspoken address was delivered from the chair of the Röntgen Society on Nov. 7th by the new President, Captain C. Thurstan Holland, R.A.M.C. (T.). He stated that during the war mistakes, sometimes grievous ones, in interpretation and localisation had occurred as a result of X ray work carried out by unskilled and untrained operators. The man in charge of the X ray department should be medically qualified, be well up in medical and surgical diseases, possess knowledge of certain special diseases also, and in addition should have a thorough understanding of physics, chemistry, and electricity, and be capable to some extent of helping as an electrical engineer. While lay assistants might be permitted to undertake the minor work of the department, they should not be allowed or expected to make a diagnosis from plates, or give opinions, or undertake the screening of deep parts, or regulate the X ray or electrical treatment of cases. Captain Holland expressed great dissatisfaction at the present position of radiology in this country. In small hospitals up and down the land he feared that many of the X ray installations, worked as they were frequently by untrained medical men or equally untrained non-medical persons, were of very varying value to the community, and that the good they did in some cases might be more than counterbalanced by errors. The time had come, he believed, to protest against the position, as electro-therapeutics were becoming more and more important in all directions. Radium treatment should not be detached from other methods of treatment, and the time for separate radium institutes where this was the one and only method of treatment had gone by. He pleaded for the proper recognition of radiology and electro-therapeutics, and the teaching of these subjects at the hospitals and universities. Captain Holland's view will receive endorsement from his colleagues, though now cannot be the time to devise further elaboration of the medical curriculum. It is true that in America such teaching has already been organised, but for the present we can only look to courses of post-graduate study to supply our educational needs. When the close of the war allows the detailed consideration of the problems of medical education, we may be quite certain that Captain Holland's plea for adequate recognition in the curriculum of radiology and electro-therapeutics will receive earnest attention. X ray work has proved of such paramount importance that the teaching of it will not be shelved. The teachers of these subjects should have a recognised status, and here the start must come, as Captain Holland says, from some university.

GELATIN AS A NUTRIENT.

RECENT bio-chemical researches show that under certain conditions gelatin can replace the proteins for the purposes of nutrition. It was formerly held that gelatin was not capable of building tissues, and that in no sense could it be regarded as a true substitute for proteins. In a very interesting series of experiments conducted in the bio-chemical laboratory at Cambridge by Ginsaburo Totani, and reported in the October number of the *Bio-Chemical Journal*, some evidence is offered that the addition of the amino-acid tryptophane alone to the hydrolysis products obtained from pure gelatin made these efficient in maintaining the nutrition of animals. The addition of tyrosine did not give the same decided effect as tryptophane. The results, however, refer to the use of hydrolysed gelatin, for when intact gelatin was used, it was badly digested and absorbed, which explains the failure to obtain good results upon the addition of the missing amino-acids in previous experiments. With the addition of tryptophane to hydrolysed gelatin in the cases of four rats experimented upon, two were not only able to maintain their weight but also exhibited some growth. The general condition of these animals also remained satisfactory. The condition of the other two rats of this set was also, for a long time, much better than that of rats receiving no tryptophane. It is concluded, therefore, that rats can maintain themselves upon the hydrolysed products of gelatin when tryptophane alone is added. The amino-acids are rapidly assuming great importance in the problems of nutrition and their differentiation as to the individuals which help and which do not help assimilation is very remarkable.

THE Government have decided to appoint a Food Controller, and a form of "war bread" will be instituted.

WE regret to record the death of Mr. Robert L. Swan, sometime President of the Royal College of Surgeons of Ireland. An obituary notice will appear in a later issue.

AT the meeting of the Section of Epidemiology and State Medicine of the Royal Society of Medicine on Friday, Nov. 24th, at 8.30 P.M., a discussion on Cerebro-spinal Fever will be held, opened by papers by Dr. W. H. Hamer and Captain M. Greenwood.

A DISCUSSION will be held at a meeting of the Harveian Society of London on Thursday, Nov. 23rd, on the Treatment of Fractures. The discussion will take place at the Stafford Rooms, Titchborne-street, Edgware-road, W., at 8.30 P.M., and will be opened by Mr. Robert Jones and continued by Mr. Jackson Clarke, Mr. T. H. Kellock, Mr. F. Romer, and Mr. Laming Evans.

MEMORANDUM ON TETANUS.

THE following notes on the prophylaxis and treatment of tetanus have been compiled with the authority of the War Office Committee for the study of tetanus, and are to a great extent based on experimental and clinical evidence which has become available since the beginning of the present war.

The Prophylactic or Preventive Treatment of Tetanus.

The prophylactic value of injections of antitetanic serum is beyond all question, but there is strong experimental evidence that in about ten days the immunity conferred by the primary injection is to a great extent lost. It is, therefore, the general opinion that a second subcutaneous injection should be given in all cases of septic wounds, and in order to anticipate the total disappearance of the antitoxin from the body, the second injection should follow the first at an interval of seven days.

In cases of long-continued septic wounds, particularly those caused by shell or bomb, third and fourth injections at seven-day intervals are recommended. It is self-evident that if it is considered necessary to give a second injection, then it is equally necessary to give a third or fourth or more prophylactic injections, as the passive immunity conferred by the antitetanic serum is of short duration.

It may be definitely stated here that the danger of anaphylactic shock is negligible when prophylactic doses of 500 U.S.A. units contained in 3 c.c. of horse serum are given subcutaneously, whatever the interval after the preceding injection.

Dosage in prophylactic or preventive treatment of tetanus.—The primary injection should consist of 500 U.S.A. units, and the second and following injections should be, for the present, of the same amount. The primary injection is given as a rule at a dressing station or field ambulance, as soon as the wounded soldier is removed from the firing line. The second and following injections will most frequently be given at home hospitals. The ordinary phial usually contains 1500 units of tetanus antitoxin. One-third of a phial should, therefore, be injected into each wounded man. There is no necessity to sterilise the syringe after each injection; the serum is aseptic and, moreover, contains an antiseptic; it will be sufficient if a freshly sterilised needle is used for each case.

Precautions to be taken before operating on wounds.—When operations are performed at the site of wounds, even if they are healed, a prophylactic injection of serum should invariably be given if the operation be performed at a greater interval than seven days from the last injection. Cases have occurred in which the performance of simple operations has been followed by an attack of tetanus, although in many cases the primary wound had been healed several weeks before the operation. This precautionary injection may consist of a single subcutaneous injection of the ordinary prophylactic dose of 500 units, given when possible two days before the operation. It is better to give it two days before the operation, as it takes some 48 hours for antitoxin to be fully absorbed after subcutaneous injection. Injected intramuscularly the absorption is quicker—said to be about 12 hours—so that this method could be used if time were pressing. Of course a larger dose than 500 units may be injected if thought advisable.

Antiseptics which may be of use in the preventive treatment of tetanus.—The group of oxidising antiseptics, such as hydrogen peroxide, potassium permanganate, chlorine water, and solution of iodine, are particularly unfavourable to the anaerobic growth of the tetanus bacillus. They have the power of rendering toxin non-toxic.

Diagnosis.

The classical symptoms of tetanus as described in the majority of the text-books refer to a phase of the disease when treatment has already lost much of its value. With many medical men tetanus is not tetanus until the symptoms of risus sardonicus and lockjaw are present. In those who have been protected by prophylactic injection of antitoxin trismus and general symptoms practically never occur, and the manifestations of tetanus are confined to local spastic rigidity of the wounded limb, which may persist for weeks.

The early diagnosis of tetanus is of the greatest importance. All clinical and experimental evidence tends to show that the chances of successful treatment diminish rapidly with the length of time after the first symptoms are observed. Tetanus toxin reaches the motor nerve cells by travelling up the nerves. It is not directly conveyed to the central nervous system by the blood. In a large number of cases the toxin appears to reach the spinal cord primarily by the nerves which are in connexion with the seat of the injury, and hence the motor nerve cells governing the muscles round about the wound will be the earliest affected, such affection showing itself in the form of spasticity and increased reflex excitability of the muscles near the wound. In some cases these symptoms may precede other symptoms of tetanus by many hours. It is therefore desirable that the muscles in the vicinity of the wound should be examined whenever dressings are removed, and the occurrence of rigidity or twitchings or local increased reflex response to gentle tapping or pressure immediately reported to the surgeon in charge.

All nursing sisters engaged in dressing wounds should be warned to give the alarm if the muscles round the wound are harder or more rigid than the muscles of the uninjured limb or side. Other early symptoms of diagnostic importance may be anxious look, pain in back or neck, sore throat, general restlessness, unreasonable outbursts of temper, insomnia, violent headache, excessive yawning, complaints of spasm or stiffness in injured limb, stiff-neck or difficulty in swallowing without recognisable cause, stitch in side, profuse local or general sweats, and difficulty in micturition.

It is very desirable to obtain the coöperation of medical officers in the endeavour of the Committee to formulate the early symptomatology of this disease, and to confirm or add to the above. Any brief account of early symptoms noted both in the major and in the minor forms of the disease will be of great value, and officers are requested to forward any such observations to Surgeon-General Sir David Bruce, chairman of the Tetanus Committee, at the Royal Army Medical College, Grosvenor-road, London, S.W.

Therapeutic or Curative Treatment of Tetanus.

It cannot be too strongly emphasised that time is the all-important element in the treatment of tetanus. As short a time as possible should be allowed to elapse between the diagnosis and the commencement of active treatment. A delay of an hour may make all the difference between success and failure. It is on this account that the early symptoms are of the greatest importance. In almost every case of tetanus there are found local manifestations of the disease, very often hardness and rigidity of the muscles round the wound, and these signs can be seen or felt for days or even weeks before the occurrence of trismus. In a case on record these local symptoms had been present for three weeks before the trismus showed itself and before tetanus was suspected. One medical officer is reported to have said that symptoms of tetanus were present in a case, but were not sufficiently severe to justify the use of antitoxin. According to present ideas it should no longer be permissible to wait for the occurrence of lock-jaw before pronouncing the word tetanus; 5000 units of antitoxic serum are of more avail at the very beginning, when the disease is still localised, than 50,000 when the symptoms have become general. The moment, then, any local manifestation of tetanus is observed it is recommended to proceed at once to vigorous specific treatment.

The treatment of tetanus may be divided into specific and symptomatic:—

1. *Specific.*—Specific treatment consists in the giving of tetanus antitoxin, which has the power of rendering the tetanus toxin with which it comes in contact non-poisonous. From what has been said above about the injurious effect of delay it is obvious that it is necessary to give antitoxin by the method which enables it to produce its effect most quickly. Subcutaneous injections of serum are absorbed very slowly, 48 hours may elapse before a dose is fully absorbed; hence little can be expected from this method at the beginning of treatment.

Experimental and clinical evidence has shown that the best results are obtained by intrathecal injections of serum.[1] This direct attack on the toxin in the neighbourhood of the central nervous system should be supplemented by intramuscular injections in order to neutralise any toxin in the blood, and thus prevent any more of it being taken up by the nerve-endings in muscle. Absorption of antitoxin from muscle is rapid, reaching its maximum in about 12 hours. In addition to the intramuscular method, subcutaneous injection can be practised at any time, and is particularly useful in the later stages in keeping up the antitoxic quality of the blood. Absorption reaches a maximum in two or three days. It is recommended that intravenous injections should not be made as the risks of anaphylactic trouble occurring are greater when serum is given intravenously than when it is given by any other route.

Dosage in the therapeutic or curative treatment of tetanus.—When given curatively antitoxic serum must be administered in very large doses. In a case of tetanus the first thing to do is to give an intrathecal injection of antitoxin.

The amount of cerebro-spinal fluid which can be withdrawn will, as a rule, not be more than 20 c.c. It is usually held to be undesirable to run in more serum than will replace the cerebro-spinal fluid drawn off, and in the cases when little or no fluid can be withdrawn it is not wise to inject more than 20 c.c. of serum *and this very very slowly.*

[1] A description of the method of performing an intrathecal injection is given as an appendix.

If the serum used be of the ordinary strength of 150 units in 1 c.c., the patient will then receive a dose of some 3000 in 20 c.c. If the serum be of higher potency, say 800 units to the c.c., the patient will then have received 16,000 units. For intrathecal injections this high potency serum, if procurable, should by all means be used. At the same time 5000 to 10,000 units should be injected intramuscularly, and 3000 to 5000 may also be given subcutaneously. The intrathecal injections may be repeated daily for three to five days, when they should as a rule be discontinued. The intramuscular and subcutaneous injections may be continued daily or oftener, according to the severity of the symptoms. When the disease shows distinct signs of abating the size of the dose may be gradually decreased, the interval between the doses lengthened, and the serum given only subcutaneously.

The following may be given as an example of the serum treatment which has been successfully employed in early, but well-marked, tetanus:—

Day.	Subcutaneous.	Intramuscular.	Intrathecal.
1st day	—	8,000	16,000
2nd day	—	8,000	16,000
3rd day	—	4,000	8,000
4th day	—	4,000	8,000
5th day	2,000	—	—
7th day	2,000	—	—
9th day	2,000	—	—

2. *Symptomatic.*—Symptomatic treatment consists in the exhibition of sedative drugs. Perhaps the most suitable is morphia in ¼ grain doses and administered every four hours; potassium bromide, chloral, chloretone, paraldehyd, are also given by the mouth or rectum. Carbolic acid: There is no convincing evidence that the carbolic acid treatment of tetanus has any curative effect whatever, or any action upon the course of the disease. Magnesium sulphate: Treatment by sulphate of magnesium has no effect upon the disease itself. The cessation of spasm which follows an injection is only temporary, and is purchased at the cost of risks which are far from negligible. It is very doubtful if any real advantage is gained by its use.

Surgical treatment of the wound.—There is a general impression that it is of advantage to excise the wound, or amputate the limb in cases of tetanus. The matter is one upon which there is considerable difference of opinion. From the clinical experience of many observers it would seem that these procedures are of little avail and may actually accelerate the course of the disease. Animal experiment, so far as it goes, also suggests that operative measures are useless. While more evidence is required before any dogmatic statement can be made, it appears safer to abstain from surgical interference with the wound until the ordinary treatment for tetanus has been carried out, unless there exist other and imperative reasons for immediate operation. The irrigation of the wound with oxidising agents, such as hydrogen peroxide, when this can be done without undue disturbance and without opening up the wound, is to be recommended.

Reporting and care of cases.—In every Command one or more officers with special knowledge should be detailed by the D.D.M.S. to visit and assist in treatment of cases of tetanus. These officers should be at the general hospitals of the district, and their names and telephonic addresses should be communicated to the officers and medical practitioners in charge of subsidiary and V.A.D. hospitals. On occurrence of a case of tetanus the appointed officer will be immediately informed, and he will at once proceed to visit the case and offer assistance in the carrying out of such treatment as has been suggested in the present memorandum. He will if necessary assist in the operation of lumbar puncture and intrathecal injection. This will seldom be necessary, as from what has already been said as to the danger of even an hour's delay this intrathecal injection will usually have been done before his arrival, unless the distance to be travelled is short. He will make careful inquiry into the case in order to ascertain if any early symptoms had been present and had escaped notice. He will note what prophylactic injections have been made, and if omitted, why they were omitted. When visiting the hospital where the case has occurred he will ascertain if the other wounded men are receiving prophylactic injections. He should see that sufficient notes of the case are being kept in order that the tetanus form can be filled up as fully as possible. For example, it is very seldom that the distinguishing marks on the bottles of serum are reported. If serum trouble arises it is evident that this information would be useful. He will forward an inspector's report to Surgeon-General Sir David Bruce, with as little delay as possible. The ordinary tetanus report will be filled in by the medical officer in charge of the case.

Officers in charge of hospitals will be responsible for the administration of the second and following prophylactic doses of antitoxin to all wounded under their care, unless reasons exist for withholding them. The administration of antitoxin will be recorded on the case sheet. They will also as heretofore inform Surgeon-General Sir David Bruce, by telegram, of the occurrence of a case of tetanus, and on the death or recovery of the case forward the usual tetanus report in accordance with War Office instructions. Any abnormalities of behaviour of antitetanic serum should be carefully noted and reported.

As the Tetanus Committee was appointed for the purpose of studying tetanus, it is greatly to be desired that every medical officer will coöperate in a collective investigation, and submit any evidence in his possession which may add to our knowledge of the disease and its treatment.

APPENDIX.

The method of performing an intrathecal injection.—The patient should preferably be under general anæsthesia, but the operation can be performed with local anæsthesia. The skin over the area of the fourth and fifth lumbar spines should be painted with iodine or cleansed with soap and water followed by an antiseptic. A spinal needle and 20 c.c. syringe should be boiled in normal saline, and the surgeon must observe throughout the most rigorous aseptic precautions. The patient is bent head to knees, so as to present as fully a curved back to the operator as possible, and the position of the fourth lumbar spine ascertained by drawing an imaginary line between the crests of the ilia. The tip of the finger is placed on the supraspinous ligament connecting the summits of the spinous processes of the fourth and fifth lumbar vertebræ. The needle is inserted about three-eighths of an inch to one side of the middle line, and directed forwards and slightly upwards and inwards. If the needle strikes the bone it should be withdrawn and a fresh attempt made. The canal is reached at a depth on an average of about 2½ inches. The trocar is withdrawn and about 20 c.c. of cerebro-spinal fluid allowed to flow out into a measured vessel. The syringe is then fitted to the needle and the serum injected. It is important that the serum be heated to the temperature of the body and the injection made very slowly. The canal can also be reached by pushing the needle through the supraspinous ligament in the middle line half-way between the two spinous processes. If several injections have to be made it is well to choose fresh sites. Blocking of the flow of the cerebro-spinal fluid by a blood clot may be overcome by reinserting and withdrawing the trocar. The bed should be tilted at the foot and the pillow removed for an hour or two after the injections.

SCOTLAND.

(FROM OUR OWN CORRESPONDENTS.)

King Manuel's Visit to Military Hospitals.

King Manuel of Portugal brought his recent tour of military hospitals to a close with a visit to the Edinburgh War Hospital at Bangour. The King was accompanied throughout his tour by Colonel Robert Jones, Director of Military Orthopædics, and by Major H. J. Stiles, Assistant Director for Scotland, representing the Red Cross Society. Colonel Jones stated that fully 70 per cent. of the injuries incurred in the war required orthopædic treatment, and the provision of equipment for this purpose was therefore one of the most pressing needs of the time. He described the electrotherapeutic department carried on by Mr. Thomas Rankine as one of the best in the country. King Manuel spoke of the need for curative workshops such as those installed at Hammersmith, and stated that if the Red Cross Society supplied the workshops and their equipment in the various orthopædic hospitals the War Office would guarantee to keep them up.

Scottish Association of Insurance Committees: Annual Conference.

At the recent annual conference of the Scottish Association of Insurance Committees held in Aberdeen a resolution to the following effect was submitted from the National Association of Insurance Committees:—

That the Association welcome the proposal that discharged soldiers should be provided with medical benefit, to include specialist and consultative treatment, and that they are satisfied that Insurance Committees will gladly welcome the proposal that they should carry through these arrangements.

After discussion, in which the extra work involved in carrying out the resolution was described as imposing an impossible burden upon the Insurance Societies, it was agreed to remit the matter to the Executive Committee with power to take any action it might see fit. Dr. J. C. McVail, Vice-Chairman of the Scottish Insurance Commissioners, delivered an address, in which he advocated a closer coöperation between the public health authorities and the Insurance Committees in regard to sanatorium benefit. Domiciliary treatment was, he said, at a disadvantage in the usual two-roomed house of Scotland compared with the roomier houses in England. In Scotland, too, there was a tendency to live in the kitchen; the

Scotsman must be educated to use his house for after-care. A great difficulty in the carrying out of the Edinburgh scheme for the employment of arrested tuberculous cases in out-door work had been the unreasoning fear of infection, not on the part of the employers, but of the employees. Dr. Matthew Hay, in the course of an address to the Conference, said that he was becoming more and more convinced that a single communal or State health and medical service would give the best results for the health of the community. They were, he said, rapidly drifting into a tangle of administrative difficulties, which a State service would at once unravel. The Insurance Act had already provided what was almost a State medical service for workers. The last Education Act enforced a medical service for school children. The Government, by a Treasury Grant, was asking for a similar service for infants and mothers, and was almost at the same moment compelling arrangements for the treatment at the public expense of all sufferers from venereal diseases. The local authority was taking an ever-growing part in the treatment, as well as the control, of infectious diseases. The Poor-law authorities had long provided for the treatment of the poor, and the Factory Acts were dealing more and more with the health of factory workers, and especially with occupational diseases. The pressing need was now, in his opinion, of a system under which all these services, with those of the medical institutions of all kinds, could be coördinated without overlapping, and therefore with economy and efficiency. Such a unified service could take a larger and more effective part in preventive medicine. In his opinion it would come.

Dundee Dental Hospital.

The third annual meeting of the Dundee Dental Hospital was recently held. The report recorded the establishment during the year of a dental school in Dundee and the granting of a dental diploma by the University of St. Andrews. Lectures from the honorary dental staff had been appointed, and Dundee was now as well equipped in the matter of dental training as any of the other large cities in the kingdom. The hospital had continued during the year to be of much use to the military authorities, and in all 2011 soldiers and 770 civilian patients had been treated. The revenue for the year was £140 5*s.* 11*d.* and expenditure £138 9*s.* 7*d.* Efforts had been made to enlist the sympathy of employers, and in one case a firm had subscribed £20 to be spent in dental aid to their employees. Cards and pamphlets had also been distributed, dealing with the importance of the general care of the teeth, among the military stationed in the district, and also among the mills, factories, and missions of the city.

Edinburgh Sphagnum Moss Depôts.

Surgeon-General J. C. Culling, D.D.M.S., Scottish Command, recently paid a visit of inspection to the depôts in Edinburgh dealing with the supply of sphagnum moss for the treatment of the wounded. Accompanied by Colonel Cathcart and Sir John Cowan he visited in succession the works at Albion-road, where the processes of drying, picking, sublimating and preparation for pressing are carried on, the storerooms in Queensferry-street, and the workrooms at 37, Palmerston-place. In a short address to the officials and workers General Culling said that the work which was being done in connexion with these dressings was fully appreciated by the medical branch of the War Office. The value of sphagnum moss as a dressing for septic wounds was becoming widely recognised and he was doing his utmost to introduce it into all the military hospitals of Scotland.

Nov. 14th.

PARIS.

(FROM OUR OWN CORRESPONDENT.)

A Deadly Microbe.

Professor Laveran brought before the Academy of Sciences a research on the etiology of gas gangrene conducted by MM. Weinberg and Séguin in the Institut Pasteur. This complication, one of the gravest which can occur in gunshot wounds, is caused by the development in the wounds of several anaerobic microbes. The authors now describe a very curious and very dangerous bacillus in the wound flora. This microbe possesses the property of rapidly destroying the tissues, and MM. Weinberg and Séguin have given it the name of the histolytic bacillus. If a culture of this organism is inoculated into the thigh of a guinea-pig, at the end of some hours a progressive local liquefaction of the tissues is observed. The muscles of the thigh, their sheaths and vessels, even the skin itself, are digested and transformed into a blood-stained pulp, and there remains no more of the denuded limb than the bare skeleton on which the animal still bears its weight. The tibia is often spontaneously detached from the femur, the animal surviving 24 hours with this horrible mutilation. Dangerous in itself, this microbe is the more so in that it favours the appearance of gas gangrene. The anaerobes producing gas infection find an excellent culture-medium in the altered tissues digested by the histolytic bacillus. It is a frequent organism in wounds and must be combated. The authors are now engaged in preparing a serum against this new pathogenic microbe.

General Anæsthesia by Means of Intubation in Operations on the Head and Neck.

Dr. Guisez, surgeon in charge of the Oto-laryngological Centre of the 10th District, has brought before the Academy of Medicine a new method of general anæsthesia based on the fact that with the help of a special sound introduced through the mouth by direct laryngo-tracheoscopy it is possible to administer directly, through the trachea, an exactly adjusted mixture of air and chloroform. This proceeding, which Dr. Guisez has applied for many months on the patients of his centre, is of special service in all operations on the head and neck in which general anæsthesia is difficult to maintain throughout the operation. It has the advantage of shortening by one-half all operations on the mouth and pharynx, and of removing the anæsthetist from the field of operation as a possible source of infection; it permits of an exact plugging of the pharynx and of the mouth, rendering impossible the aspiration of blood and septic products into the air-passages, a frequent cause of broncho-pneumonia. In all the very bloody operations on the face, mouth, pharynx, and larynx the method can replace a preventive tracheotomy, and is devoid of the inconveniences of the latter.

To Raise the Arterial Pressure in Wounded Men.

Professor Charles Richet has just laid before the Academy of Sciences some recent experiences of great interest made by M. Towsend Porter on wounded men, in whom a marked lowering of arterial pressure was observed. When arterial pressure sinks to 50 mm., it does not rise again spontaneously, and special treatment is necessary without delay. M. Porter recommends three or four proceedings to raise the pressure. The first, which is the simplest, and which Professor Richet also recommends, consists in keeping the patient's head 5 or 6 cm. below the level of his body. The second is the injection of adrenalin. The third is the transfusion of blood. These methods are likely to be widely adopted, for the number of wounded with blood pressure reduced to 50 mm. is exceedingly great.

Inauguration of the Edith Cavell Hospital School.

A new hospital school has just been founded in Paris in the Rue Desnouettes in memory of the heroic Edith Cavell, and has been inaugurated under the presidency of the Under Secretary of State for Hygiene, M. Justin Godart. The ceremony was rendered impressive by the presence of many military and civil notables from all the Allied countries. M. Godart recalled in moving terms the memory of the heroic martyr and the aim of the new foundation which is designed to form a training school of professional nurses. The surgeon-in-chief is Professor Hartmann and the doctor in charge, Mme. Dr. Girard-Mangin, who since the beginning of the war has gained the title of médecin-aide-major, owing to her devotion to the wounded in the hospitals at the front.

Nov. 11th.

VITAL STATISTICS.

HEALTH OF ENGLISH TOWNS.

IN the 96 English and Welsh towns with populations exceeding 50,000 persons at the last Census 8050 births and 4415 deaths were registered during the week ended Saturday, Nov. 11th. The annual rate of mortality in these towns, which had been 11·8, 12·9, and 12·6 per 1000 in the three preceding weeks, rose in the week under notice to 13·3 per 1000 of their aggregate civil population estimated at 17,312,295 persons for the year 1915. During the first six weeks of the current quarter the mean annual death-rate in these towns

averaged 12·6, against 12·4 per 1000 in London. Among the several towns the death-rate last week ranged from 6·6 in Reading, 6·8 in Enfield, 6·9 in Coventry, 7·9 in Ealing, and 8·2 in Hornsey, to 18·0 in South Shields, 18·8 in Exeter, 19·5 in Grimsby, 21·1 in Gateshead, 21·5 in Dewsbury, and 23·0 in Hastings.

The 4415 deaths from all causes were 233 above the number in the previous week, and included 250 which were referred to the principal epidemic diseases, against 316 and 229 in the two preceding weeks. Of these 250 deaths, 127 resulted from infantile diarrhœal diseases, 60 from diphtheria, 26 from measles, 17 from whooping-cough, 11 from enteric fever, and 9 from scarlet fever, but not one from small-pox. The annual death-rate from these diseases was equal to 0·8, against 0·7 per 1000 in the previous week. The deaths of infants (under 2 years) from diarrhœa and enteritis, which had steadily declined from 477 to 131 in the eight preceding weeks, further fell to 127, and included 40 in London, 11 in Liverpool, 8 in Birmingham, and 5 each in Manchester and Salford. The deaths referred to diphtheria, which had been 40, 53, and 39 in the three preceding weeks, rose to 60, of which 15 were registered in London and 3 each in East Ham, Plymouth, Birmingham, Middlesbrough, and Newcastle-on-Tyne. The fatal cases of measles, which had been 17, 13, and 22 in the three preceding weeks, rose to 26, and included 8 in London, 4 in Birmingham, and 3 in Manchester. The deaths attributed to whooping-cough, which had been 10, 13, and 20 in the three preceding weeks, fell to 17, and included 2 each in London, Hull, and Rhondda. The deaths referred to enteric fever, which had been 11, 11, and 5 in the three preceding weeks, rose to 11, and included 2 each in London, Bolton, and Cardiff. The fatal cases of scarlet fever, which had been 7, 5, and 12 in the three preceding weeks, fell to 9, of which 2 occurred in Manchester.

The number of scarlet fever patients under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, which had been 1057, 1130, and 1141 at the end of the three preceding weeks, further rose to 1171 on Saturday last; 157 new cases were admitted during the week, against 125, 197, and 146 in the three preceding weeks. The cases of diphtheria, which had increased from 1262 to 1528 in the eight preceding weeks, further rose to 1541; 202 new cases were admitted during the week, against 188, 231, and 186 in the three preceding weeks. These hospitals also contained on Saturday last 67 cases of measles, 45 of enteric fever, and 36 of whooping-cough, but not one of small-pox. The 1125 deaths from all causes in London were 73 in excess of the number in the previous week, and corresponded to an annual rate of 13·6 per 1000. The deaths referred to diseases of the respiratory system, which had been 132, 142, and 164 in the three preceding weeks, further rose to 201 in the week under notice.

Of the 4415 deaths from all causes in the 96 towns, 180 resulted from violence, 359 were the subject of coroners' inquests, and 1404 occurred in public institutions. The causes of 56, or 1·3 per cent., of the total deaths were not certified either by a registered medical practitioner or by a coroner after inquest. All the causes of death were duly certified in Leeds, Bristol, West Ham, Bradford, Newcastle-on-Tyne, and in 69 other smaller towns. Of the 56 uncertified causes, 13 were registered in Birmingham, 11 in Liverpool, 4 in Gateshead, 3 each in West Bromwich and Sunderland, and 2 each in Ilford, Warrington, Manchester, South Shields, and Tynemouth.

HEALTH OF IRISH TOWNS.

In the registration area of Dublin 181 births and 162 deaths were registered during the week ended Saturday, Nov. 11th. The annual rate of mortality, which had been 17·5, 18·7, and 15·9 per 1000 in the three preceding weeks, rose to 21·3 in the week under notice, against 13·6 and 14·7 per 1000 in London and Glasgow respectively.

The 162 deaths from all causes included 29 of infants under 1 year and 53 of persons aged 65 years and upwards. Six deaths (of infants under 2 years) were referred to diarrhœal diseases and 2 to whooping-cough. The causes of 14 deaths were uncertified, and 1 other was the subject of a coroner's inquest, while 69, or 43 per cent., of the total deaths occurred in public institutions.

During the same period 181 births and 109 deaths were registered in the city of Belfast. The deaths corresponded to an annual rate of 14·6, or 1·3 per 1000 less than in the previous week, and included 21 of infants under 1 year and 22 of persons aged 65 years and upwards. Six deaths (of infants under 2 years) were referred to diarrhœal diseases, and 1 each to measles and whooping-cough. The causes of 2 deaths were uncertified, 1 inquest was held, and 33 of the total deaths occurred in public institutions.

THE EDWARD HAIN COTTAGE HOSPITAL.—It has been decided to erect a cottage hospital at St. Ives (Cornwall) as a memorial to the late Captain E. Hain, who was killed at Gallipoli. The cost of the undertaking will be £3000.

THE SERVICES.

ROYAL NAVAL MEDICAL SERVICE.

To be Deputy Surgeon-General: Fleet-Surgeon G. Trevor Collingwood, M.V.O.

Fleet-Surgeon J. McElwee is placed on the Retired List with the rank of Deputy Surgeon-General.

To be temporary Surgeons: R. M. Barrow, C. N. Carter, and D. L. Lees.

ARMY MEDICAL SERVICE.

Colonel S. Hickson, C.B., K.H.S., is retained on the Active List, under the provisions of Articles 120 and 522 Royal Warrant for Pay and Promotion and to be supernumerary.

ROYAL ARMY MEDICAL CORPS.

To be temporary Lieutenant-Colonel: C. L. Starr, C.A.M.C.

To be temporary Majors: Captain C. Hunter, C.A.M.C., and R. Bibby.

Captain W. W. Waller has relinquished his commission on account of ill-health.

Temporary Captains relinquishing their commissions: B. A. West (on account of ill-health), M. Murphy, J. H. C. Green, D. Wainwright, J. A. Glover, J. Henderson, J. F. Herbert, C. R. Smith, F. E. Daunt, A. Gibson, and D. R. Mitchell (on account of ill-health).

Temporary Lieutenants to be temporary Captains:—E. Bromley, N. McGowan, R. H. Oliver, H. P. Helsham, T. J. Simpson, A. Darlow, H. C. Addison, J. C. Pounden, A. G. Bryce, C. H. H. Coetzee, J. W. B. Thornburn, C. L. S. James, E. Caudwell, H. Mitchell, C. A. Dottridge, R. S. Ellis, S. P. Moore, J. C. Mackwood, J. J. Reynolds, W. F. Moore, J. R. Tibbles, G. Morris, E. C. Girling, T. W. Sweetnam, J. D. Evans, F. Morres, A. Neilson, R. D. Attwood, R. L. Thornley, A. W. Frew, F. H. Bromhead, E. Boyers, H. A. L. Banham, A. W. Holthusen, C. S. Dodson, W. N. H. Bell, D. Sims, W. H. Welsh, H. T. Wilkins, W. Mercer, F. J. Cleminson, C. H. Graham, S. A. Forbes, H. A. Ash, A. B. Blomfield, T. F. Lumb, E. J. Primrose, A. H. Spicer, H. Spong, M. McNiff, V. M. Coates, C. A. R. Gatley, R. B. Lothian, G. S. Murray, K. N. MacLean, A. C. E. Gray, R. P. N. B. Bluett, E. O. Gilkes, A. B. Simpson, A. P. Gray, B. M. Bennett, A. W. Popert, W. MacDermott, A. R. Elliott, H. E. S. Stiven, J. G. Morrin, W. J. Olivey, R. Heaton, R. MacGill, R. H. Simpson, C. C. O'Kell, S. L. Hinde, R. Burges, D. H. Pennant, R. R. Elworthy, A. M. Kennedy, W. A. Higgins, G. T. Walker, J. P. McGreehin, D. J. Macdougall, J. H. Murray, R. K. H. Gillespie, A. Dick, H. L. McCormick, N. W. Gilchrist, C. R. Edwards, J. Rigby, K. McA. Ross, J. K. Muir, E. L. Ivens, A. J. Dunlop, E. M. Litchfield, P. M. Ragg, H. A. Forrester, A. E. F. F. Huntsman, T. G. Wakeling, A. Burns, and F. E. Marshall.

To be temporary Captains: H. Stokes, B. W. Housman, A. M. Fisher, C. Willoughby Anderson, C.A.M.C., and A. E. Giles.

Temporary Lieutenants relinquishing their commissions: R. Butterworth, T. B. Newman, C. H. F. Johnston, C. E. Durrant, C. M. Roberts, T. McC. Sellar, R. R. Kirwan, A. H. Manfield, W. G. McConnell, G. B. Wiswell, A. Wight, H. M. Hardy, W. S. Hart, D. T. Price, W. M. Christie, W. O'Donnell, A. Dixon, G. Henderson, F. J. Morrin, S. G. J. Dowling, R. D. Hodge, T. J. Lloyd, J. P. Scatchard, H. D. Wyatt, W. L. Scott, R. R. Kilpatrick, J. W. Mathie, W. R. Burton, J. F. W. Waters, and G. Blair.

To be temporary Lieutenants: F. A. Juler, W. A. Loxton, R. Semple, C. Watson, L. W. Davies, P. Maguire, A. McCredie, W. H. Kirk, A. J. Macleod, W. Laird, J. R. Fleming, A. L. Saunders, H. O'H. H. May, and M. J. Walsh.

Temporary Honorary Lieutenant A. B. Jones, having ceased to be employed with the Welsh Hospital, relinquishes his commission.

To be temporary Honorary Lieutenants: E. H. Durham, whilst employed with the Welsh Hospital, Netley, and W. H. Thomas, whilst serving with the British Red Cross Society in France.

SPECIAL RESERVE OF OFFICERS.

Lieutenants to be Captains: R. D. Lawrence and H. S. Evans.

Lieut. (on probation) J. A. C. Kidd is confirmed in his rank.

To be Lieutenants: O. C. L. Hughes; G. K. E. Inman, from Sheffield University Contingent, O.T.C.; A. B. Dummers and J. A. Hill, from University of London Contingent, O.T.C.; A. G. Anderson, E. Chapelle, F. J. C. Johnstone, J. Ratcliffe, and J. Sellar, from Edinburgh University Contingent, O.T.C.

TERRITORIAL FORCE.

Eastern Mounted Brigade Field Ambulance: Lieutenant P. J. Smyth to be Captain.

Attached to Units other than Medical Units.—Captains to be temporary Majors whilst commanding troops on hospital ships: D. Dickie and R. M. Wilson. To be Captains: Lieutenants F. N. Walsh and H. Jacques

Correspondence.

"Audi alteram partem."

OUR DUTY.

To the Editor of THE LANCET.

SIR,—When on his return journey from the South Pole Captain Scott realised that his great adventure might terminate in disaster to himself and his comrades, his thoughts, as his diaries clearly show, turned not on himself and his own safety, but on what might happen to the wives and children if death overtook his party. In a letter to Sir J. M. Barrie he says: "I leave my wife and your godson, Wilson leaves a widow, and Edgar Evans a widow in humble circumstances. Do what you can to get their claims recognised." In a letter to Mr. J. F. Kinsey he says: "My thoughts are for my wife and boy; if I knew my wife and boy were in safe keeping, I should have little regret in leaving the world." The very last words he wrote were: "For God's sake look after our people." In the present war already many of the younger members of our profession have sacrificed their lives in the most heroic manner tending the wounded under heavy gun-fire. Who can doubt that in the period before a big engagement their thoughts have centred, not on themselves and their own safety, but rather on what might happen to their wives and children, if they fell?

Is it not a duty, an urgent duty, falling on all of us who are not called to serve in the danger zone to see that we spare no effort to safeguard the interest of those who fall? If we do our duty what a load of anxiety we shall remove from the minds of those of our profession who know that at any moment they may be called upon to face danger or death.

In the pages of your journal you have already announced the fact that a society has been started for the express purpose of assisting in the education and starting in life of orphans whose fathers have died in the present war without having had the opportunity of making provision for their families. The president of this society is Sir Alfred Keogh; it has a representative body of vice-presidents and a strong working committee. Many donations have already been received, varying in amount from 1 to 50 guineas, and annual subscriptions from 1 to 5 guineas. It is quite clear that a great deal of money will be required if adequate help is to be given, and especially valuable will be annual subscriptions. The secretary of the Auxiliary R.A.M.C. Fund, to give it its proper title, is Lieutenant-Colonel F. W. H. Davie-Harris, 124, Victoria-street, S.W., who is ready to give all information.

In conclusion, I would ask any member of the profession who reads this letter not to dismiss the points raised at once, but to ask himself whether the support of the fund does not make a strong appeal to him as a personal duty in the great struggle in which we are all engaged, a duty the fulfilment of which should give him much satisfaction in the thought that although he himself is not called to enter the danger zone, he may, by some personal sacrifice of his own comfort, contribute in removing a great anxiety from those of his younger brethren who may be called upon to make the supreme sacrifice of their lives.

I am, Sir, yours faithfully,

Oxford, Nov. 13th, 1916. WM. COLLIER.

LOCAL TETANUS.

To the Editor of THE LANCET.

SIR,—Since my attention was called to this subject by Colonel Rudolf I have seen in consultation nine cases of the so-called local tetanus—three at the Canadian Hospital, Taplow, with Colonel Mewburn; three at the Base Hospital, Oxford, with Major Hurst; one at the Beechborough Park Hospital, with Dr. Clarke and Dr. Tisdale; one at Sheffield, with Major Mouat; and one at Milton Hill, with Dr. Turner. They fall into three groups: 1. Local spasm of a limb preceding for several days the onset of severe general tetanus, as in Dr. Turner's case, which recovered. 2. True localised tetanus, confined to one limb, or to a group of muscles, or to both legs, as in Major Mouat's case, persisting for many weeks. Recovery is the rule. One of Major Hurst's patients died in a remarkable toxæmia without general spasms. I have neither seen nor heard of an instance of Rose's head tetanus, the only localised form generally recognised before the present war. 3. Pseudo-tetanus. Every muscle spasm following a wound is not tetanus. In Newcastle, Mr. Rutherford Morison mentioned a case of supposed local tetanus, but when I visited the ward the patient was out. The notes stated that the spasms in one leg began immediately after a scratch received from wire, and the description given by the nurse of the gait suggested a form of functional spasm. The patient at Beechborough Park had clonic spasm in one leg, varying with posture, and greatly intensified when watched. He was highly emotional, and after several weeks of observation Colonel Armour and Dr. Clarke came to the conclusion that it was a neurosis. Possibly, too, there are cases of the reflex spasm, associated with wounds, described by Babinski.

I am, Sir, yours faithfully,

Oxford, Nov. 12th, 1916. WILLIAM OSLER.

THE USE OF A STANDARD AGGLUTINATION TECHNIQUE IN THE ARMY.

To the Editor of THE LANCET.

SIR,—Dr. P. N. Panton raises interesting points in his paper in THE LANCET of Oct. 28th on the inadvisability of universally employing Dreyer's standard agglutination technique. After a year's experience of it, may I be allowed to offer a few comments, without attempting to discuss all the points raised—no doubt they will be dealt with by Professor Dreyer or Dr. Ainley Walker. I disagree, however, in passing, with Dr. Panton's statement that it is "impossible to determine with scientific exactitude the number of bacteria present in a suspension." I believe it can be done with as much "exactitude" as the determination of the number of red cells in a drop of blood, if use is made of a counting chamber somewhat resembling the Thoma-Zeiss hæmocytometer chamber, but 0·02 mm. deep, also an optically plane cover-slip, a weak solution of carbol-thionin, and an oil-immersion lens.[1]

Dr. Panton contends that Dreyer's method is cumbersome and inaccurate, and as equally good if not better methods are used by others, its "enforcement" as a standard is "naturally resisted." I do not think the method has been enforced, at any rate on civilian pathologists.

With regard to the alleged cumbersome nature of Dreyer's technique, I wish to allude to some of the ways we have saved time when using it on a large scale. Small zinc boxes were made which contain two of the racks supplied by the Research Committee; four of these boxes fit into the two compartments of a Hearson's paraffin oven, consequently one oven will admit of at least eight bloods being tested at the same time. We employ a large number of pipettes. At the end of the day they are all washed out with water, alcohol, and ether, and dried in a hot-air oven. Mr. R. Donald points out that the standard pipettes are not all the same size, and this introduces an error; but I think that in practice the error is less serious than he believes. Doubtless in future "standard" pipettes will be of a standard size; there is no real difficulty about that. If, however, the *same pipette* is used for each test, this source of error is removed. In our own work published before Donald's paper appeared, we usually employed only one pipette for each test, and held it at the same angle when distributing the drops.[2] If one pipette is used, then according to the printed directions, so Dr. Panton says, it must be washed out "six times with three different solutions, or 18 times altogether, for a single test against one bacillus." This must be a mistake for 18 times with *three* bacilli—i.e., typhoid, paratyphoid A, and paratyphoid B. If pure water is used instead of saline, and this is permitted by the directions, the frequent washing and drying is unnecessary. Our own procedure has been as follows, and though it differs slightly from the directions, I think it is sufficiently accurate and saves much time.

The six drops of serum to be tested are distributed from a clean and absolutely dry pipette. The surplus serum is then discharged and the pipette washed out three or four times

[1] See THE LANCET, April 11th, 1914.

[2] Glynn, E. E., and Lowe, E. Cronin, THE LANCET, 1916, vol. ii., p. 222.

with the diluent, namely water, 54 drops of which are added to make the dilution of 1 in 10; there is no need to wash and dry the pipette first. The wet pipette is next used for distributing the water in the small dilution tubes. The surplus water is then blown out of the teat, and by shaking the pipette with the hand any drop on its end is removed. The wet pipette, which now contains inside and out about one-third of a drop of water—this I have ascertained by weighing—is rinsed out in the mixture of serum and water, which is then distributed with it into the small dilution tubes; the addition of a third of a drop of water to 60 is of no practical importance. The pipette is again washed out with water three or four times, emptied, and shaken as before, and then rinsed out in the bacillary emulsion, which is next distributed in the dilution tubes.

In order to save the time in *counting* the 15 drops of bacillary emulsion it is a very simple matter to calibrate the pipette to hold the right amount by marking the glass with a file. If care is taken to select pipettes which are all approximately the same size as measured by a gauge, then one calibrated pipette can always be used for the typhoid emulsion only, another for the paratyphoid A, and a third for the paratyphoid B. This saves still more time. In fact, instead of washing out the pipette with three different fluids and drying on six occasions "for a single test against one bacillus," it is then only necessary to wash the pipette three or four times with one fluid on one occasion to make a single test with three different emulsions, excluding the final washing and drying.

Dr. Panton would not leave Dreyer's technique "in the hands of a laboratory attendant," for he is convinced "that it is a procedure which should never be advocated even for the most simple manœuvres." Most people will cordially disagree. Dr. Panton must have been singularly unfortunate in his trained laboratory attendants, for, of course, he is aware that every laboratory of any size makes use of them. The embedding and cutting of paraffin sections or the preparation of ordinary media are usually left to laboratory attendants; in carrying out this and other work they successfully practise manœuvres which cannot be described as "most simple." One wonders who makes the 5 per cent. glycerine agar used by Dr. Panton, and who standardises it.

One of the great advantages of Dreyer's technique is its *simplicity;* not only are the emulsions reliable, safe, and always ready for instant use, but any intelligent laboratory attendant who is careful and has a steady hand can learn to perform it satisfactorily in a very short time, especially if the reasons for the technique are properly explained to him. Of course, I do not advocate that the attendant should read the results, or interpret them.

With regard to the accuracy of Dreyer's method, personally I find that results obtained by the macroscopic technique are much easier to read than those obtained by the microscopic. In our opinion the method is most satisfactory and reliable; for example—

(*a*) We have isolated paratyphoid A or B 15 times from soldiers mostly convalescent, and on each occasion the blood has agglutinated the corresponding emulsion.

(*b*) Sixty-six consecutive convalescent cases of "enteric" had their agglutinins estimated to typhoid on four occasions at intervals of about a week. In 34 convalescents, or more than half, all four tests gave the same results and in 15 others three tests gave the same results.[3]

Dr. Panton's objections to using Dreyer's method as a standard are very similar to those which would be urged by any manufacturer against the use of any given standard method, because it happened to be different from the one which he was employing. There is not sufficient "standardisation" of methods, apparatus, and parts in this country in spite of the efforts of the Engineering Standards Committee and other bodies. The British naturally object to standardisation because it interferes with their individual freedom. Personally I think the Research Committee in advocating the use of standard methods for agglutination tests have rendered a service to the Army. Until they were introduced military bacteriologists, often with little or no experience, were using different macroscopic and microscopic agglutination techniques, emulsions of different densities of sometimes dead and sometimes living organisms, derived from different strains of different inherent agglutinative capacity, cultivated on different media for different periods of time, perhaps at different temperatures. Last, but not least, they were using different standards to mean a positive or a negative result. Had Dreyer's method been employed earlier in the war far fewer soldiers would have been invalided home from the East with a diagnosis of "typhoid." After all, standardisation is an essential part of all military organisation. Even if Dreyer's method is not absolutely the *best*, yet the advantages of using it as a standard method far outweigh any disadvantages; naturally, experts using other methods object.

Dr. Panton suggests that a simpler plan than employing Dreyer's method would be to allow workers the choice of any recognised method and leave a "central committee" to convert their findings "into equivalent results." Surely, this is an impracticable suggestion in the middle of a great war, when bacteriologists are not available to personally investigate the various methods used and when we want to get results *now*, not after the war.

Dr. Panton is unwilling to join in the "Hymn of Hate" which, he alleges, is *now* being directed at Dr. Tidy—his former collaborator in two papers—for making statements regarding the value of serum reactions in patients with fever, previously inoculated against typhoid. Dr. Donaldson and Miss Clark, Dr. Lowe and myself are among those who have *recently* "directed" criticisms at Dr. Tidy's statements, but we have not criticised him, and certainly have not been so rude as to sing hymns at him.

In conclusion, my remarks refer only to the use of typhoid and paratyphoid emulsions; I have had very little experience of the dysentery and Gaertner emulsions.

I am, Sir, yours faithfully,

ERNEST GLYNN,
Captain, R.A.M.C. (T.

Thompson Yates Laboratories, University of Liverpool, Nov. 6th, 1916.

[3] Glynn, E. E., and Lowe, E. Cronin, THE LANCET, 1916, vol. ii., p. 222.

BRITISH SCIENCE GUILD.

To the Editor of THE LANCET.

SIR,—At a recent meeting of the Medical Committee of the British Science Guild I was desired to communicate with you upon the following points:—

1. A letter received from Sir Lauder Brunton shortly before his death. (I enclose copy.) With regard to paragraphs 11 to 14 inclusive, I am to say that the questions therein mentioned—the remuneration of the medical profession generally, the difference between the fees commanded by surgeons and doctors, &c.—are of particular interest to the Medical Committee of the Guild, who invite correspondence upon them through your columns if you are good enough to publish the letter or portions of it.

2. A letter from the Local Government Board, a copy of which I enclose. Some months ago the Medical Committee of the Guild were informed that there existed in certain Poor-law institutions in England and Wales an objectionable method of feeding a number of young children with the same spoon, a practice calculated greatly to spread infectious and contagious diseases. The committee communicated with the Local Government Board suggesting the appointment of voluntary lady inspectors who would visit the institutions and see the children fed. The Local Government Board, however, were unable to agree to this suggestion, but stated that the question would be brought to the notice of their ordinary inspectors. It has now been finally stated that the practice is not adopted in Poor-law institutions in England and Wales.

3. Feeding of boys at the public schools. A letter was recently received by the Medical Committee dealing with the following points: (*a*) That boys are sent to the public schools at the most critical period of their development, and it is therefore most important that they should have plenty of good and nourishing food. (*b*) That under the prevailing system the catering for each house is in the hands of the housemaster, who, to a great extent, makes his living out of the boarding fees. (*c*) That in the majority of cases the food provided is not of a sufficiently nourishing character, canned foods and twice-cooked meat figuring largely on the menus to the exclusion of fresh meat and vegetables.

The Medical Committee sent a copy of this letter to an eminent food expert, and his reply is as follows:—

With reference to your communication on the feeding of boys at the public schools, I think the facts as stated are true and call for correction. The system of housemasters living on the profits of their catering also seems to me to merit the condemnation passed upon it. The remedy for the evils enumerated is not, perhaps, to be obtained easily,

but it ought to be within the powers of the Medical Committee of the British Science Guild to lead public opinion on the matter.

The committee also sent a copy of the letter to the honorary secretary of the Incorporated Association of Headmasters, and his reply runs:—

I am much obliged for the letter enclosed. The difficulty is that schools vary very much; some of what is said would be quite unfair if applied to a good many. If the British Science Guild would produce some specimen dietaries—programmes for a month at a time, so as to show how a wholesome variety could be secured—I think it might be a very useful piece of work.

In the original letter received by the committee the suggestion is made that the catering at each public school should be taken out of the hands of the housemasters and put into the hands of an *ad hoc* committee. I am to state that the Medical Committee are in general agreement with the above proposal, and would be glad to receive correspondence on the subject.

I am, Sir, yours faithfully,

RONALD ROSS,
Chairman of the Medical Committee, for the British Science Guild.

199, Piccadilly, London, W., Nov. 2nd, 1916.

[ENCLOSURE.]

(1) Extracts from a letter addressed by Sir Lauder Brunton to a correspondent on July 3rd.

11. The whole question of the remuneration of the medical profession and of its various branches will naturally give rise to much discussion.
12. For example, I have of late years frequently been consulted in regard to abdominal operations. The question shall an operation be performed or not? has been left entirely in my hands, and on the correctness of my answer the life of the patient has depended. Yet for my advice I received the fee of 3 guineas. If an operation was necessary the surgeon received 100 guineas.
13. This enormous disproportion between the values of mere mechanical skill and trained brain work holds in other branches also.
14. These high surgical fees are one of the causes why some kind of coöperative hospital is becoming urgently needed.

(2) Copy of letter from Local Government Board on feeding of infants in institutions:—

The Hon. Secretary, Medical Committee, British Science Guild. 17th July, 1916.

SIR,—In reply to your letter of the 5th inst., I am directed by the President of the Local Government Board to state that the feeding of a number of children with the same spoon is not a practice adopted in Poor-law institutions in England and Wales.

I am, Sir, your obedient servant,
(Signed) H. W. S. FRANCIS.

THE DANGERS OF THE DIAGNOSTIC INJECTION OF TUBERCULIN.

To the Editor of THE LANCET.

SIR,—By their interesting note in THE LANCET of Oct. 28th on the Occasional Absence of a Rise of Temperature following the Administration of Diagnostic Doses of Tuberculin to Tuberculous Persons, Dr. D. Forbes and Dr. C. W. Hutt have, I hope, hammered another nail into the coffin of the diagnostic injection. Probably they would have found a febrile reaction had they measured the temperature in the rectum every two hours (the night included) during the first 30 hours. Occasionally a tuberculous patient's temperature may be normal or subnormal all day, and may become febrile only for a short time about midnight. But if we accept the writers' contention as proven, the diagnostic injection, which practically every sanatorium physician of experience regards as very dangerous, is convicted of being misleading also. I have known a hypodermic injection of a few drops of water provoke a typical tuberculin reaction; and if, on the other hand, a large dose of tuberculin occasionally provokes no febrile reaction in a tuberculous subject, why continue to play with this edged tool? It may, indeed, occasionally be necessary for the civilian practitioner to risk a diagnostic injection so as to convince the military authorities that a recruit is tuberculous. More's the pity, for there are plenty of cases on record in which rapid progress of the disease began directly after a diagnostic injection. The victim in such a case is surely entitled to feel almost as aggrieved as the mediæval ladies who established their innocence of witchcraft at the cost of drowning.

I am, Sir, yours faithfully,

Peppard Common, Nov. 9th, 1916. CLAUDE LILLINGSTON.

THE ETHICAL STANDARDS OF PANEL PRACTICE.

To the Editor of THE LANCET.

SIR,—When Dr. O. Eccles (in his letter in your issue of Nov. 4th) "presumes" that the word "panel" in my address to students refers to National Health Insurance practice, and that it "strongly suggests" that panel practitioners are tempted by the conditions of panel practice to dishonour their calling, he implies that there may be another interpretation of the term as used by me. Having been so far generous, he has no justification in reproving me severely. He proceeds to describe this interpretation of his as a "remark" of mine, and brands it as "offensive." I did not mention or refer to panel practice nor to panel practitioners, nor did I have them in my mind. The theme of the first part of my address was the motives that influence students and their parents in their selection of medicine as a calling. Incidentally I deprecated a fact, which cannot be denied, that in some instances their interest in the matter is what I called "purely commercial"—simply and solely to make a living out of it; and I hinted (I assure Dr. Eccles on good authority) that the panel as a public service has increased such instances. As for the term "commercial," it may not be appropriate nor happily chosen, and I regret that it has given offence, but surely it does not imply something dishonourable.—I am, Sir, yours faithfully,

Harley-street, W., Nov. 8th, 1916. J. MITCHELL BRUCE.

THE DIFFERENTIATION OF HEART MURMURS IN SOLDIERS.

To the Editor of THE LANCET.

SIR,—I have read Professor D. Drummond's letter on this subject in your issue of Nov. 4th. I do not think the majority of heart-strain cases in soldiers have an apical murmur at all. It occurs to me that the type of murmur he describes seems what is generally called a "cardio-pulmonary murmur," due to the lung and not to the heart at all, and that accounts for his statement that when pressure is made by the stethoscope the murmur ceases, due, I think, to air being expelled from the subjacent lung.

I am, Sir, yours faithfully,

A. KINSEY-MORGAN, M.D.Durh., M.R.C.P.Edin.

Bournemouth, Nov. 9th, 1916.

THE QUEEN'S HOSPITAL FOR CHILDREN: NEED FOR CLINICAL ASSISTANTS.

To the Editor of THE LANCET.

SIR,—We shall be grateful if you will kindly draw attention to the need that exists at the Queen's Hospital for Children for additional assistance in seeing medical out-patient cases, the numbers of which have greatly increased since the commencement of the war. The committee would be prepared to appoint clinical assistants to sit with the physicians and would welcome inquiries on the subject from qualified men or women.

I may mention that we are now dealing with 2000 attendances of children per week.

I am, Sir, yours faithfully,

T. GLENTON KERR,
Secretary.

The Queen's Hospital for Children, Hackney-road, Bethnal Green, E., Nov. 14th, 1916.

MASSAGE AND MEDICAL ELECTRICITY IN THE AFTER-TREATMENT OF CONVALESCENT SOLDIERS.

To the Editor of THE LANCET.

SIR,—May I be allowed to answer one or two points in Dr. W. Gordon's letter in your issue of Nov. 11th? Although my article was written in genuine admiration of the splendid work carried out in the Command Depôts by the medical officers in charge of the depôts, together with their staff, I am accused of suppressing certain facts as to their equipment in order to push what are described as "my own special views," whatever these may be. For instance, I do not

mention the diathermy at Ripon. The explanation is simple. There is no diathermy at Ripon.

With reference to my "truly extraordinary want of knowledge regarding the *eau courante*," I personally have always regarded it, together with all other forms of heat treatment, as an adjuvant to massage. It may, however, interest Dr. Gordon to know that Dr. Faidberbe, who is now in charge of the "Physiothérapie" at the Hôpital St. Maurice, and who was instrumental in installing the *eau courante* at the Grand Palais, informed me that he never used massage in conjunction with it, and that in his clinique it had almost entirely superseded massage. If there is anything in the value of training, then the assumption that better work is obtained from those who have had six months' training than from those who have trained for one month is surely justified.

As regards my ignorance of the Zander treatment I can only say that I attended Professor Zander's clinique when studying in Stockholm. Can Dr. Gordon claim to have done the same? I am, Sir, yours faithfully,

Cavendish-square, W., Nov. 13th, 1916. F. BARRIE LAMBERT.

ABORTION CAUSED BY A STRANGULATED FALLOPIAN TUBE IN A FEMORAL HERNIA.

To the Editor of THE LANCET.

SIR,—Mr. E. G. Renny's case published in THE LANCET of Oct. 21st on the rarity of the presence of the Fallopian tube in a femoral sac reminds me of a similar instance which came under my care in 1908. The patient, aged 36, who was pregnant four months and had come to Folkestone for a holiday, was seized with acute abdominal pain in the left lower abdomen whilst at an entertainment. The following day (August 18th) the pain continued and was referred to the left femoral region, where a swelling the size of a chestnut was detected. This swelling was painful to the touch on examination. The same day a blood-stained vaginal discharge appeared, which was the starting of a miscarriage. For a few days there was no evident change in the swelling in the left femoral region, but on August 24th there was marked increase both in the severity of the pain and also in size, which called for surgical interference. The operation revealed a femoral sac containing a deeply congested, almost black, Fallopian tube and its fimbriated extremity. This was excised. The following year the patient gave birth to a living child.

I am, Sir, yours faithfully,

Folkestone, Nov. 2nd, 1916. JOSEPH E. G. CALVERLEY.

CHADWICK LECTURES ON CHILD WELFARE.—Dr. Charles Porter, medical officer of health for Marylebone, completed this week a series of three lectures at the Norwich Museum on matters relating to child welfare. In his first lecture he dealt with the antenatal care of the child, emphasising the importance of the health visitor in personal supervision of the expectant mother. An analysis of the causes leading to the death within a year of one-tenth of the infants born occupied the second lecture, and Dr. Porter ascribed to the hygienic and educational measures already applied a saving of 20,000 infant lives per annum. In the third lecture the mortality, amounting to over 60 per 1000, of children between their first and fifth birthdays was discussed; one-third of it at least, being due to infectious disease, was preventable, and the remainder, Dr. Porter felt sure, could be limited by a system of child consultations and home visiting of young children.

ROYAL DEVON AND EXETER HOSPITAL.—At a special meeting of the governors of this charity, which was recently held, Mr. C. E. Bell was appointed honorary consulting surgeon and also an honorary life member of the committee, in recognition of his long and valuable work in connexion with the hospital. Mr. Bell has been connected with the Royal Devon and Exeter Hospital for about 45 years.—The annual meeting of the governors of the West of England Eye Infirmary was held at the Royal Devon and Exeter Hospital on Nov. 3rd. The Eye Infirmary has been taken over as a military hospital, and the work of the institution is now being performed at the Royal Devon and Exeter Hospital. The medical report stated that 1700 patients were treated during the past 12 months; of these, 1314 were cured or benefited. The financial statement was satisfactory, and showed the income was £1714; the expenditure amounted to £1013. The late Mr. G. Mortimer, who has recently died, bequeathed £500 to the infirmary.

The War.

THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue:—

Died of Wounds.

Capt. H. Mathewson, R.A.M.C., attached Northampton Regiment, received his medical education at Queen's University, Belfast, and qualified in 1910. After holding the appointments of senior assistant medical officer of the Portsmouth Infirmary and of resident medical officer of the Norwich Workhouse and Infirmary, he returned to Ireland, and joined the R.A.M.C. in March, 1915, gaining his captaincy in March last.

Lieut. J. R. Brown, R.A.M.C., attached Royal Garrison Artillery, received his medical education at Glasgow University, and qualified in 1897. He was at one time house surgeon at the Teignmouth Hospital, and saw service in the South African War. Later he became a medical officer to the British South Africa Company in Southern Rhodesia, and resigned his appointment to join the R.A.M.C. in February this year.

Previously reported Wounded, now reported Died of Wounds.

Capt. G. H. Watson, R.A.M.C.

Died.

Capt. V. J. Ruttledge, R.A.M.C., received his medical education at Trinity College, Dublin, and qualified in 1891. For some years he held the position of assistant medical officer of the District Asylum, Londonderry, and joined the R.A.M.C. in May, 1915.

Wounded.

Capt. C. R. Grant, M.C., R.A.M.C., attached Royal Field Artillery.
Capt. O. De Muth, R.A.M.C.
Lieut. J. W. Wayte, R.A.M.C., attached Hampshire Regiment.
Lieut. A. C. Wilson, R.A.M.C., attached Northumberland Fusiliers.
Capt. H. J. Bower, R.A.M.C.

Previously reported believed taken Prisoner at Kut-el-Amara, now reported Prisoner.

Capt. G. O. Weston, Indian Subordinate Medical Department.

Previously reported Prisoners in Turkish Hands, now reported Exchanged.

Major E. V. Aylen, R.A.M.C.
Lieut.-Col. H. O. B. Browne-Mason, R.A.M.C.
Capt. A. S. Cane, R.A.M.C.
Capt. W. L. E. Fretz, R.A.M.C.
Lieut.-Col. J. Hennessy, C.B., R.A.M.C.
Capt. A. T. J. McCreery, R.A.M.C.

DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war:—

Second Lieut. C. U. Kilner, Suffolk Regt., eldest son of Dr. C. S. Kilner, of Bury St. Edmunds.
Capt. F. E. G. Porter, Loyal North Lancashire Regt., elder son of Dr. W. E. Porter, J.P., of Wood Green, London.
Capt. W. M. Stewart, Devonshire Regt., attached to the Machine Gun Corps, only son of Dr. R. W. Stewart, Australian Army Medical Corps, of Adelaide, South Australia.
Lieut. J. R. Brown, R.A.M.C., attached to the Royal Garrison Artillery, third son of the late Dr. J. R. Brown, of Saltcoats, Ayrshire.
Second Lieut. E. G. Leggatt, Argyll and Sutherland Highlanders, only son of Dr. G. S. Leggatt, of Harpenden, Herts.
Second Lieut. C. F. H. Fenner, Scots Guards, son of Mr. R. Fenner, of Spanish-place, Manchester-square, London.

THE HONOURS LIST.

The following awards to medical officers for conspicuous gallantry and devotion to duty in the field are announced:—

Distinguished Service Order.

Temp. Capt. George Douglas Ferguson, M.B., R.A.M.C.

Tended the wounded under very heavy fire, bringing in over fifty wounded men, and displaying the greatest courage and determination. His fearless bearing set a fine example.

Major Lewis Wibmer Jeffries, Australian A.M.C.

Tended the wounded and reorganised the stretcher-bearers in the front line at great personal risk. When only a few bearers were left he himself assisted to carry back the wounded under heavy fire.

Lieut.-Col. Ethelbert Brown Hardy, Canadian A.M.C.

Controlled the evacuation of the sick and wounded, and by his energy and courage kept up the spirits of the stretcher-bearers when they were much exhausted.

Lieut.-Col. Harry Merville Jacques, Canadian A.M.C.

Supervised the clearing of the front and controlled the work of the advanced and main dressing stations with great skill and personal courage.

Bar to the D.S.O.

Temp. Capt. Hugh Llewellyn Glyn Hughes, D.S.O., R.A.M.C.

On four separate days he showed an utter contempt for danger when collecting and tending the wounded under heavy shell-fire. (D.S.O. recorded in THE LANCET, Sept. 2nd, 1916.)

Military Cross.

Temp. Capt. Malcolm King Acheson, M.D., R.A.M.C.

Tended the wounded under very heavy fire, displaying great courage and determination. By his devotion and initiative he was instrumental in saving many lives.

Temp. Capt. John Alban Andrews, M.B., R.A.M.C.

Tended the wounded with utter disregard of personal danger, dressing their wounds under heavy sniping fire from a trench 450 yards distant. He also got the wounded into shell-holes till they could be collected after dark.

Capt. James Elliot Black, M.B., R.A.M.C., Special Reserve.

Rendered valuable services when attending the wounded under heavy machine-gun and shell-fire. Later he went out into "No Man's Land" to succour the wounded.

Capt. Austin Basil Clarke, M.B., R.A.M.C.

Showed great coolness during the assault, and for 30 hours afterwards under intense shell and machine-gun fire. He tended the wounded in the open the whole time, his aid-post being full, and, after dark, went out and searched the wood under heavy shell-fire.

Temp. Lieut. Sydney John Darke, M.B., R.A.M.C.

Although badly wounded he worked for five and a half hours under heavy shell-fire, tending the wounded, without letting any one know he was wounded himself. His gallantry throughout the operation was very fine.

Capt. Henry Bryan Frost Dixon, M.B., R.A.M.C.

Volunteered and led a stretcher party to a regimental aid-post under very heavy fire, and successfully brought in 25 wounded men.

Temp. Lieut. John Beatson Dunning, M.B., R.A.M.C.

Went into the open under heavy shell-fire and tended the wounded until he was himself severely wounded.

Temp. Lieut. William Norman Gilmour, M.D., R.A.M.C.

Gallantly dressed a wounded man lying in "No Man's Land," and finally brought him in, with great courage, under very heavy fire.

Temp. Lieut. Robert Inkerman Harris, M.B., R.A.M.C.

Commanded the stretcher-bearers throughout the entire day under incessant fire, and set a fine example of energy and pluck.

Temp. Capt. Frank Melville Harvey, R.A.M.C.

Repeatedly tended the wounded in the open under very heavy fire, and worked continuously for 36 hours, showing an utter disregard of danger.

Temp. Capt. Richard Harold Hodges, R.A.M.C.

Organised and led parties of stretcher-bearers under heavy fire, displaying great courage and determination.

Capt. William John Sivewright Ingram, M.B., R.A.M.C., Special Reserve.

Tended the wounded under very heavy fire, displaying great courage and determination throughout. He set a splendid example of coolness and devotion to duty.

Temp. Capt. Edward Sandwith Johnson, R.A.M.C.

Although severely wounded, he remained at his aid-post, and continued to dress the wounded with great skill and determination. He has previously done splendid work.

Capt. John Herbert Jordan, R.A.M.C.

Under very heavy fire he reconnoitred the front area for wounded, and by his gallantry was instrumental in recovering many wounded men from shell-holes.

Temp. Capt. John Macintyre, M.B., R.A.M.C.

Tended and dressed the wounded under heavy fire with great courage and determination, himself being four times buried by shells.

Capt. William Edward Marshall, M.B., R.A.M.C.

Tended the wounded under very heavy fire with great courage and determination. On one occasion he worked single-handed for over 24 hours.

Capt. William Archibald Miller, D.S.O., M.B., R.A.M.C., Special Reserve.

Accompanied a raiding party with his stretcher-bearers, and remained in the enemy trenches until quite certain no raiders were left behind. Previously he had accompanied a patrol under heavy fire and tended the wounded. He has on many previous occasions displayed great gallantry and determination.

Temp. Capt. John Hay Moir, M.D., R.A.M.C.

Although wounded, he tended the wounded under very heavy fire, displaying great courage and determination, and refusing to be relieved until all the wounded had been evacuated.

Temp. Capt. Patrick Joseph O'Reilly, R.A.M.C.

Tended the wounded under intense fire, displaying great courage and determination. Later, although wounded, he stuck to his post.

Temp. Capt. Wyndham Parker, M.B., R.A.M.C.

Tended the wounded under very heavy fire for 36 hours, displaying great courage and determination. Later he rescued wounded officers under intense fire.

Temp. Capt. William Henry Parsons, M.D., R.A.M.C.

Established the most advanced aid-post of the brigade front, and, although slightly wounded, cleared over 300 cases. Subsequently, working all night, he cleared in all over 400 cases.

Capt. Edward Phillips, M.B., R.A.M.C.

Collected wounded under heavy shell, rifle, and machine-gun fire. He set a fine example by his complete disregard of danger.

Temp. Capt. James Henry Ritchie, M.B., R.A.M.C.

Tended the wounded and organised stretcher parties under very heavy fire, displaying great courage and determination.

Capt. Hugh Huntley Robinson, R.A.M.C.

Tended the wounded with great courage and skill, quite regardless of personal danger. He has on many previous occasions displayed the greatest bravery.

Temp. Lieut. Clifford Maunsell Scott, R.A.M.C.

Tended wounded with great skill and determination under intense fire. He has done fine work on many previous occasions.

Temp. Capt. John Telfer Smeall, M.B., R.A.M.C.

Tended wounded with great skill and determination under intense fire. He has done fine work on many previous occasions.

Temp. Lieut. Frederick James Strachan, M.B., R.A.M.C.

Tended and dressed the wounded under heavy fire, with great courage and determination. Later, although himself wounded, he continued to carry out his fine work.

Capt. John Ronald Rigden Trist, R.A.M.C., Special Reserve.

Tended and dressed the wounded under heavy fire, with great courage and determination. He has on many previous occasions done fine work.

Temp. Capt. Gideon Walker, M.B., R.A.M.C.

Cleared the wounded of the battalion with remarkable efficiency. In addition, he worked for two days under heavy and continuous shell fire evacuating wounded.

Capt. Archibald Wilson, M.B., R.A.M.C., Special Reserve.

Organised and led parties of stretcher-bearers under very heavy fire, displaying great courage and determination. He has on many previous occasions done fine work.

Temp. Lieut. Clarence Randolph Young, M.B., R.A.M.C.

Tended the wounded under very heavy fire, displaying great courage and determination.

Capt. Charles Corlis, Australian A.M.C.

Tended the wounded under very heavy fire with great courage and determination, working continuously for three days and nights.

Capt. William Wallace Stewart Johnston, Australian A.M.C.

When his battalion was relieved, he stayed behind to tend the wounded, and then went forward through a heavy enemy barrage and dressed a wounded officer and several other men in the front trench. He also tended others while returning under fire.

Capt. James Sprent, Australian A.M.C.

Tended the wounded under very heavy fire with great courage and determination. He personally supervised and organised the forward portion of tending the wounded right up to the firing line.

Capt. David Macdonald Steele, Australian A.M.C.

Tended the wounded under very heavy fire and trying conditions with great courage and determination. It was due to his organisation and skill that the wounded men were successfully evacuated.

Capt. William Henry Weston, Australian A.M.C.

Established an aid-post in the open and tended the wounded under very heavy fire. He has displayed great courage and determination throughout.

Capt. Kenneth Edgar Cooke, Canadian A.M.C.,

Tended the wounded for two days and nights, under intense fire, with great gallantry and ability.

Capt. Howard Brown Jeffs, Canadian A.M.C.

Although wounded himself, he tended the wounded under very heavy fire with great courage and determination. Later, being again wounded, he remained on duty till relieved.

Capt. Victor Henry Kingsley Moorhouse, Canadian A.M.C.

Tended the wounded under very heavy fire, displaying great courage and determination throughout.

Capt. Thomas Francis O'Hagan, Canadian A.M.C.

Rescued a wounded officer and five men under very heavy fire. Later he tended the wounded in an advanced dressing-station under heavy fire. He displayed great courage and determination throughout.

Capt. Alex. Harold Taylor, Canadian A.M.C.

Tended the wounded under very heavy fire with great courage and ability. He has on many previous occasions displayed great bravery.

Capt. William Lawrence Whittemore, Canadian A.M.C.

Although wounded he carried out his duty with great courage and determination. He has on many previous occasions displayed great gallantry.

Bars to the M.C.

Temp. Capt. Cyril Mary Brophy, M.C., R.A.M.C.

Tended a wounded officer under intense fire. Later he carried out the work of rescuing the wounded with great courage and determination. He has on many previous occasions done fine work. (M.C. recorded in THE LANCET, August 5th, 1916.)

Capt. John Arthur Cullum, M.C., Canadian A.M.C.

Carried out the evacuation of the wounded under very heavy fire with great courage and skill, and at great personal risk. He has on many previous occasions done very fine work. (M.C. recorded in THE LANCET, August 5th, 1916.)

Temp. Capt. William Foot, M.C., M.B., R.A.M.C.

Tended the wounded without any regard for his own safety, and by his coolness throughout the action undoubtedly saved many lives. (M.C. recorded in THE LANCET, Jan. 22nd, 1916.)

A PATRIOTIC FUND FOR MEDICAL PRACTITIONERS.

The Central Medical War Committee and the Local Medical War Committees throughout the country find one of their most difficult and anxious tasks to be safeguarding the practices and interests of those who are away on service. The work of the local committees has been admirable and their members have worked hard in the interests of their colleagues. But, when all has been done, when forgetfulness, apathy, and purposeful neglect have been corrected, there must necessarily be a loss of value in the practices of the absentees, if only because there can be, during absence on naval and military duty, no natural inflow of new patients to meet an equally natural loss of old ones. And the longer the term of service the more certain will be that loss. Whilst the man is away the loss may not mean much, and in some cases his army pay may largely meet it, but on his return the loss may be serious. All his old obligations—rent, establishment charges, insurance premiums, possibly interest on money borrowed to buy the practice—all will have to be met, with increased taxation and a lessened income. Yet he cannot quit his house for a smaller, a move may mean the loss of his livelihood, he must maintain his status at all costs. The dread of these obligations hangs like a millstone round the neck of not a few of our younger men, who, but for this, would long since have been in the field; and the tale of these cases is a growing one in the experience of the war committees. These are no anticipations born of the proverbial middle-class fear of poverty. The irrefutable facts of such cases have been sent to the Central Medical War Committee, and from small provincial towns where, if anywhere, the bond between doctor and patient is stable. If in the countryside this bond be broken, how will it hold in London and the great cities?

That these hard cases must be met is a necessity and a patriotic duty. The Auxiliary R.A.M.C. Fund, whose claims are urged eloquently in another column by Dr. William Collier, cannot attempt to cover the field here indicated. The younger men must be able to take their turn of service, and both they and those already in the field must be secure of their status on their return. No Government provision will meet their heavy obligations, and to their professional brethren they cannot be allowed to turn without response. A unanimous vote of the Representative Meeting of the British Medical Association directed the Council of the Association to consider the advisability of raising some fund to help medical practitioners taking service. Investigations made by the Central Medical War Committee show that, whilst there are admirable societies ready and willing to act as the almoners of the profession in helping the families of men on service and to care for the widow and orphan, there is no way of helping men in these large financial matters other than by recourse to commercial banks and professional moneylenders.

To meet these financial difficulties a proposal supported by the Central Medical War Committee was made that a fund should be created from which loans might be made to men leaving home for military service, or on their return home, and for a period sufficient to allow of the re-establishment of their position. At the last quarterly meeting of the Council of the British Medical Association a special committee was appointed to deal with the matter, and invitations were sent to several influential medical bodies, asking them to take part in determining the character and in initiating the proposed fund.

A meeting was accordingly held at the offices of the British Medical Association on Wednesday afternoon last to consider "the formation of a patriotic fund for the use of medical practitioners who suffer financially through taking naval or military service during the war." The chair was taken by Mr. E. B. Turner, chairman of Representative Meetings of the British Medical Association, and there were present, besides the principal office-holders of the Association, representatives of the Royal College of Physicians of London, the Royal College of Surgeons of England, the Royal College of Surgeons of Edinburgh, Sir Henry Morris, treasurer of Epsom College, Dr. Samuel West, treasurer of the Royal Medical Benevolent Fund, representing also the Professional Classes Relief Fund, Dr. John Adams, Dr. C. O. Hawthorne, Lieutenant-Colonel R. A. Bolam, and Dr. William Collier, who is an energetic worker for the R.A.M.C. Auxiliary Fund. Mr. Bishop Harman, who convened the meeting, briefly stated the necessities for a Fund to supply the pecuniary needs of men who returned from service to find their practices decreased in value, their obligations pressing heavily, and for the time being their available incomes being at an end. He stated that the Prince of Wales Fund could not give adequate assistance because it might be wound up before the expiry of any term of years which would be required to make a loan scheme effective, while ordinary banking terms were prohibitive. The profession, in his opinion, therefore, would be thrown back upon the creation of a Loan Fund.

Sir Henry Morris invited details showing the necessity for the institution of such a Fund, when ample evidence was forthcoming from England and from Scotland that many hard situations already had occurred, and that many more must be anticipated. Upon this a formal resolution was passed by the meeting that a case had been made out for the formation of a Fund to assist by loans medical practitioners who suffered financial loss owing to taking service with the Navy and Army. It was strongly felt by the meeting that such a Fund must be made representative of the medical profession as a whole, and must conduct its operations on strictly business lines, temporary accommodation, not charity, being its object.

NEW V.A.D. HOSPITAL FOR DEVON.—Ryall's Court, Seaton, is to be fitted up as a V.A.D. hospital. It is hoped that accommodation will be provided for 50 patients.

A WAR CRÊCHE AT PORTSMOUTH.—A well-appointed crêche for the children of sailors and marines who have lost their lives in the war, and whose widows have to supplement their pensions by going out to work, has been opened at Portsmouth. A child-welfare and maternity sub-centre, of which there are others in the borough, will also be carried on in the house.

THE SCOTTISH WOMEN'S HOSPITAL UNIT.—Information has been received at the headquarters of the Scottish Women's Hospital in Edinburgh of the safe arrival of Dr. Elsie Inglis and her hospital unit, which has gone to assist the Roumanians at a point on the Danube close to the Russian frontier. The Croix de Guerre has been awarded to Dr. A. Louise McIlroy for her work as médecin chef first at Troyes, France, and later with the Armée d'Orient in Serbia. Dr. McIlroy is now at Salonika.

WOUNDED ALLIES RELIEF COMMITTEE.—Assorted articles contained in 148 cases, 28 bales, 7 crates, &c., were sent out last week to Salonika for the Committee's Hospital at Vodena. The stores included: Plates, kettles, meat-dishes, teapots, saucepans, mugs, basins, stationery, writing pads, pencils, ink, needles, thread, mending wool, tape, thimbles, pins, blind-cord, book muslin, calico, flannel, combs, candles, soap, biscuits, jam, marmalade, milk, rice, cocoa, lentils, peas, flour, hams, golden syrup, chocolate, soup-tablets, and safety matches, in addition to drugs, surgical appliances, medical bandages, and dressings of all kinds, stretchers, pneumonia jackets, shirts, pyjamas, waistcoats, boots, slippers, and operating stockings. A motor ambulance with spares was also despatched, and in one of the crates was a bath unit, presented by the Empress Club. The Committee sent out at the same time six cases containing swabs, bandages, &c., for the use of the Serbian Red Cross Society.

Medical News.

ROYAL COLLEGES OF PHYSICIANS OF LONDON AND SURGEONS OF ENGLAND.—At a meeting of Comitia of the Royal College of Physicians of London on Oct. 26th and of the Council of the Royal College of Surgeons of England on Nov. 9th, diplomas of L.R.C.P. and M.R.C.S. were respectively conferred upon 89 candidates—81 men and 8 women—who have passed the Final Examination in Medicine, Surgery, and Midwifery of the Conjoint Examining Board. The following are the names and medical schools of the successful candidates, viz. :—

John Arnold Molony Alcock, Guy's; Ivor Aubrey, University College, Cardiff, and University College Hospital; Augustus Rollo Balmain, Birmingham University; Herbert Edward Bamber, M.A. Oxon, Oxford University and Guy's; James Reid Banks, University College Hospital; Frank Aubrey Benner, M.D., C.M. McGill, McGill University; James Allan Berry, Durham University and Guy's; John Francis Carter Braine, Guy's; Wilfrid Stephenson Brown, B.A. Cantab, Cambridge University and St. Thomas's; John Brumwell, Durham University; Charles Noel Carter, B A. Cantab., Cambridge University and St. Thomas's; Hetty Ethelberta Claremont, Royal Free and St. George's; William John Colborne, Charing Cross; Leslie Cunningham, Cambridge University and St. Bartholomew's; Stephanie Patricia Laline Hunte Taylour Daniel, Royal Free; Albert William Abell Davies, Guy's; George Day, St. Bartholomew's; Martin Joseph de Lemos, Bombay University and King's College Hospital; Joseph Edouard Evariste de Robillard, Guy's; *Arthur Farrell Renner Dove, M.B., B.S Durh., Durham University; Alfred Beresford Dummere, London Hospital; Herbert James Duske, Edinburgh University and St. Mary's; Henry Andrew Faulkner, Melbourne University and Middlesex; Susan Alfreda Finch and Marjorie Ellen Franklin, Royal Free; Humphrey Douglas Gardner, B.A. Cantab., Cambridge University and University College Hospital; Edmund Onslow Goldsmith, B.A. Cantab., Cambridge University and St. Bartholomew's; Thomes Sacheverell Greenaway, Westminster; Llewellyn Grey, University College, Cardiff, and University College Hospital; James Maurice Harrison, St. Thomas's; Basil Haskins, Otago and Edinburgh Universities and St. Bartholomew's; Richard Brunel Hawes, St. Thomas's; John Frederic Haynes, B.A. Oxon, Oxford University and St. Bartholomew's; Graham William Heckels, Guy's; William Broke Heywood-Waddington, St. Bartholomew's; Eric Blanford Hickson, University College Hospital; John Anderson Hill and Charles Guy Hitchcock, London Hospital; Lionel Snowdon Holmwood, Middlesex; Charles Ewart Hopwood, Manchester University; George James Proctor Huddleston, Birmingham University and University College Hospital; Oscar Cecil Lawrence Hughes, Birmingham University; James Wynn Hyatt, London Hospital; Stewart Russell Johnston, University College Hospital; Percy Tudor Jones, University College, Cardiff, and University College Hospital; Guy Melville Kendall, B.A. Cantab., Cambridge University and St. Thomas's; Elias Panagis Lazanas, M.D. Athens, University of Athens and University College Hospital; Douglas Leonard Lees, Bristol University; Ernest Alfred Leviseur, Guy's; Rhys Thomas Lewis, University College, Cardiff, and University College Hospital; Eric Ivan Lloyd, B.A. Cantab., Cambridge University and St. Bartholomew's; Peter McGibbon, M.B. Tor., Toronto University; Owen Sidney Martin, University College Hospital; Arthur Morford, B.Sc. Lond., and Richard Moser, St. Bartholomew's; Bernard Mountain, M.A. Cantab., Cambridge University and University College Hospital; Noel Spencer Nairne, St. Thomas's; Charles Leslie Odam, B.A. Cantab., Cambridge University and Guy's; Mustafa Ahmed Omar, Cairo and Charing Cross; Walter Davies Pearman, Birmingham University and St. Mary's; Margaret Stuart Palmer, Royal Free; Aron Ber Pastel, Paris and Charing Cross; Enid Maud Pfeil, Royal Free; Bertram Henzell Pidcock, St. Bartholomew's; Cecil Nuttall Ratcliffe, Liverpool University; Alan Harvey Richardson, St. Thomas's; Paul Rigauld Riggall, University College Hospital; Charles Young Roberts, St. Thomas's; Arthur Rodd, University College Hospital; James Ernest Scanlan, St. Mary's; Elisabeth Henrietta Schwab, Royal Free; Ralph Roylance Scott, Durham University; Steuart Noy Scott, Charing Cross; Francis Nasmyth Sudebotham, B.A. Cantab., Cambridge University and Guy's; Gordon Ernest Lovell Simons, Guy's; Robert Gordon Simpson, London Hospital; John Forest Smith, St. Thomas's; John Walter Graham Steell, M.A. Oxon, Oxford and Manchester Universities; Harold Sterne-Howitt, Guy's; Norman Burke Taylor, M.B. Tor., Toronto University and London Hospital; Cecil Henry Terry, B.A. Oxon., Oxford University and St. Bartholomew's; Rustom Navroji Vakil, University College Hospital; Anna Petronella van Heerden, University of Amsterdam; Frank Hamilton Vey, B.A. Cantab., Cambridge University and St. Thomas's; Samuel Vidot, Guy's; Oscar Williams, B.Sc. Wales, University College, Cardiff, and University College Hospital; Thomas Pearce Williams, Middlesex; Graham Selby Wilson, Charing Cross; and William Yeoman and Campbell Young, University College Hospital.

* Diploma of M.R.C.S. conferred on Oct. 12th.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—An ordinary meeting of the Council was held on Nov. 9th, Sir William Watson Cheyne, the President, being in the chair. In accordance with a report from the Court of Examiners it was resolved to issue diplomas of Membership to 89 successful candidates. A letter was read from the Financial Secretary and Business Manager of the British Medical Association reporting that at a meeting of the Council of the British Medical Association on Oct. 25th attention was called to the heavy financial sacrifice made by many medical men who have joined the Army and Navy, and the sacrifice anticipated by those who are liable for service, and stating that the Council of the Association will be pleased if the Royal College of Surgeons will nominate a representative to serve on a committee to review the whole position, and, if possible, formulate a scheme whereby those deserving of assistance through patriotic service may be assisted. Mr. H. J. Waring was appointed to represent the Council. The secretary reported the delivery of the following museum demonstrations: By Mr. S. G. Shattock, Pathological Curator, three demonstrations on "wounds and their repair" and on "injuries to arteries"; and two demonstrations by Mr. J. F. Colyer, Honorary Curator of the Odontological Collection, on "fractures of the jaw." The President reported that the Bradshaw Lecture would be delivered by Colonel Charters J. Symonds, C.B., A.M.S., on Friday, Dec. 15th, and that the subject of the lecture would be "Gunshot Injuries of the Spinal Cord." The President reported that he had granted the use of the lecture theatre for five lectures in December on "The Part Played in Disease by Water, Salts, and other Simple Substances," by Dr. E. Mellanby, acting superintendent of the Brown Animal Sanatory Institution.

MEDICAL MAYOR.—Mr. William Fookes Thompson, M.D., C.M. Edin., coroner for the Launceston district of Cornwall, has been selected to be Mayor of Launceston for the ensuing year.

MATERNITY AND CHILD WELFARE: CONFERENCE AT DURHAM.—At a conference of medical officers, health visitors, district nurses, and social workers held recently at Durham under the auspices of the Council of the Royal Sanitary Institute, Sir Henry Turner, C.B., presiding, the subject of "Maternity and Child Welfare" was discussed. Dr. Harold Kerr, medical officer of health of Newcastle-on-Tyne, gave an account of the steps taken in Newcastle to deal with infant mortality. He commended the provision of cheap and nourishing dinners for pregnant and nursing women to benevolent consideration, and deprecated the industrial employment of nursing mothers. He regretted that under the Midwives Act it was practically impossible to obtain a conviction against an uncertified woman owing to the difficulty of proving "habitual" practice. A genuine emergency must, of course, be met with the means to hand, but unless they were careful every case would be an emergency before long, for these women were taking full advantage of the shortage of doctors and midwives to re-establish themselves. Dr. T. Eustace Hill, medical officer of health of Durham county, detailed the work of the Durham county council in dealing with the problem of infant mortality. Before health visitors were appointed the mortality was 160 per 1000; now it had been reduced to 130. But there still remained bad housing and other insanitary conditions to deal with after the visitors had done their work. The housing question must be kept to the front if the infant life of the country was to be properly safeguarded. Miss H. S. Cooper-Hodgson, county superintendent of health visitors, alluded to the lamentable lack of trained nurses in the populous districts of Durham county.

POOR-LAW MEDICAL OFFICERS' ASSOCIATION OF ENGLAND AND WALES.—At the last council meeting of this association, held at 9, Copthall-avenue, E.C., the honorary secretary, Dr. Major Greenwood, reported the case of a provincial member who held a commission in a Territorial regiment and who complained that the War Office proposed to deduct from his military pay the salary he was receiving from his guardians as workhouse medical officer, because his infirmary had been taken over by the military authorities. He was still attending to certain "scattered homes," attendance on which formed part of the duties for which his salary was paid. It was announced that the War Office had, upon this explanation, decided to permit this member the full benefit of his Poor-law salary. The medical superintendent of a large provincial infirmary wrote, asking if he were not entitled to summer holiday, and, if so, for how long, as he had been very hard worked, and had been without assistance for some time. He also asked if he ought to receive extra remuneration for attending wounded soldiers in his institution, they not being Poor-law patients. The honorary secretary said that he had explained that there was no statutory right to a holiday, and with regard to the admission of soldiers into the infirmary in the place of sick paupers the medical officer would have to attend to them, but he had the right of appeal to the Local Government Board. A letter was read from a member, stating that his board would not make him a superannuation grant or return his contributions on the resignation of his office as district medical officer, which resignation had been due to his having been called up for war service, making it impossible to carry on his practice. The Council agreed that as the member was not entitled to superannuation allowance by his length of office, nor to a return of his contributions, he must rely on the generosity of the guardians. But it was thought a great hardship that resignations of this kind should be regarded as voluntary.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

The Control of Food.

THE statement made on Wednesday by Mr. RUNCIMAN, the President of the Board of Trade, in the House of Commons on the control of food is regarded as of very far-reaching importance. The consuming capacity of the people of the United Kingdom, the right honourable gentleman said, had gone up, notwithstanding high prices. As the problem extended the Government had come to the conclusion that they must have a controller of food, someone who had nothing to do but to deal with the problem and coördinate all the activities of various departments and committees. The Government were to issue regulations under the Defence of the Realm Acts. Provision was to be made to enable proceedings to be taken against any person who wasted or destroyed unnecessarily any article of food. That would prevent milk being poured away. Powers were also to be taken to prescribe the purposes to which an article could or could not be put. Another important regulation dealt with flour and its manufacture. The old pure white flour from which had been abstracted some of its best qualities would not be milled in future. Mr. RUNCIMAN was authorised by the Local Government Board to state that regulations would be made requiring millers to produce only the straight-grade flour and to mill not less than a fixed percentage. The intention was to raise the yield of flour about 8½ per cent. Measures of control would be exercised over imported flour. If it became necessary, food tickets would have to be adopted. Closely connected with the control of food are questions of agriculture and shipping. With these the Government are dealing.

The Pensions Board.

A Bill was brought in on Tuesday by Mr. A. Henderson to establish a Board of Pensions.

HOUSE OF COMMONS.

WEDNESDAY, NOV. 8TH.

Naval Surgeons at Gallipoli.

Major HUNT asked the Secretary to the Admiralty whether naval chaplains and naval surgeons who were present at the landing and subsequent operations at Gallipoli would be asked to give evidence before the Dardanelles Commission.—Mr. MACNAMARA replied: That is entirely a question for the Commissioners themselves to determine.

Major HUNT: If these surgeons and chaplains are not called a great deal of very valuable evidence will be left out which should be heard.—Mr. MACNAMARA: It is for the Commission to carry out its duties. The Commission is empowered to call anyone it pleases, provided, of course, the presence of the witnesses can be arranged subject to the exigencies of the Service and there is no other proviso.

Invalid Prisoners of War.

Replying to Mr. MALCOLM, Mr. J. F. HOPE (Treasurer of the Household) said: An agreement has been in force between His Majesty's Government and the German Government since August, 1915, for the repatriation of British and German civilian prisoners of war who are invalids. That agreement has not worked altogether satisfactorily, but as His Majesty's Government are of opinion that the repatriation of these invalids is preferable to their internment in a neutral country, they are putting forward a proposal based on the existing agreement which it is hoped will lead to the repatriation of a larger number of invalids. The main points of the new proposal are that a definite schedule of disabilities entitling applicants to repatriation should be adopted, and that an examining medical commission should be appointed for each country, each containing two Swiss doctors.

Replying to another question put by Mr. MALCOLM, Mr. HOPE said: It has not yet been possible to put into operation the arrangement for the mutual repatriation of incapacitated prisoners of war which has been concluded between this country and the Bulgarian Government. We believe that only very few of our men would benefit by it. A similar arrangement has been concluded with the Turkish Government, who suggested that transfer should take place by way of Sweden. This appears to be impracticable, but it is hoped that an opportunity to effect the change may be found.

THURSDAY, NOV. 9TH.

Dental Treatment for Soldiers.

Mr. MACCALLUM SCOTT asked the Financial Secretary to the War Office whether private dentists were still being employed to provide dental treatment for soldiers; whether expenditure was being incurred for railway travelling expenses of soldiers to be treated; and whether there was a staff of military dentists sufficient to cope with the work.—Mr. FORSTER wrote in reply: Civilian dentists are employed at stations where there are not sufficient troops to occupy a whole-time dentist. Travelling expenses are being incurred in places where there is no dentist available. The answer to the last part of the question is in the affirmative.

Sir JOHN JARDINE asked the honourable gentleman with reference to dental personnel and equipment, whether, instead of waiting for demands which the people on the spot might not know that they were entitled to make, he would wire to the general officers commanding in Egypt, Mesopotamia, and Salonica, and inquire if they were personally satisfied with the amount of the dental personnel and equipment.—Mr. FORSTER (in a written answer) replied: I do not think that the action proposed is necessary, as general officers commanding are well aware that they will be supplied with any dental treatment that may be necessary. I may also say that the general officer commanding in Mesopotamia has specifically informed the Army Council that his requirements in dental personnel and equipment have been fully met.

Nurses in Mesopotamia.

Sir J. JARDINE asked the Financial Secretary to the War Office how many nurses there were in Mesopotamia and where they were stationed.—Mr. FORSTER replied: There are 168 nurses in Mesopotamia, who are stationed partly at Basra and partly at Amara.

Scurvy in Mesopotamia.

In answer to Sir D. GODDARD, who asked whether there had been a number of cases of scurvy amongst the troops in Mesopotamia, Mr. FORSTER wrote: There has been scurvy, but it has been confined to the Indian troops in Mesopotamia. The medical authorities in Mesopotamia have, however, taken the necessary measures to deal with it.

Pay in the Royal Army Medical Corps.

Mr. MONTAGUE BARLOW asked the Financial Secretary to the War Office whether there was a uniform rate of pay for all medical practitioners now holding commissions of equal rank in the Royal Army Medical Corps; and whether those doctors coming within the Military Service Act received less than those who came within the Enrolment Scheme.—Mr. FORSTER wrote in reply: There are two forms of temporary commissions in the Royal Army Medical Corps. Before the Military Service Act came into operation medical men joined the Army either under a special contract or through the Special Reserve. Since the Act came into force all medical men who have not enrolled with the Central Medical War Committee, and are compelled to serve, are taken into the Special Reserve. The pay of the Special Reserve is lower than that received under the contract, but when the gratuities given on cessation of employment are taken into consideration there is little difference in the emoluments.

TUESDAY, NOV. 14TH.

Cocaine in Dentistry.

Mr. RAFFAN asked the Home Secretary whether he could now state the composition of the committee which it was proposed to set up to consider whether supplies of cocaine were to continue to be available for dental purposes and the proposed terms of reference to the committee.—Mr. H. SAMUEL replied: Yes, sir. The members will be: The Right Honourable Charles Hobhouse, M.P., who, I am glad to say, has consented to act as chairman, Mr. Stanley Baldwin, M.P., Professor Bayliss, Mr. James O'Grady, M.P., and His Honour, Judge Ruegg. The terms of reference to the committee will be "to consider the authorisations granted for the use of cocaine in dentistry and to advise whether or not they might be continued or modified, and if continued, in what cases and under what conditions."

T.N.T. Poisoning.

Replying to Lord HENRY CAVENDISH-BENTINCK, who asked how many workers in the United Kingdom had in the last six months died from T.N.T. poisoning and how many of these had died from inhaling poisonous fumes, Mr. BRACE (Under Secretary for the Home Department) said: The number of deaths for the six months ending Oct. 31st is 41. It is impossible to say how many of these were caused by inhalation of fumes. There is now reason to think that absorption through the skin is the chief danger, and there may be absorption of poison by both channels in the same case.

Lord HENRY CAVENDISH-BENTINCK asked a further question regarding the installation of exhaust ventilation in connexion with T.N.T. fumes.—Dr. ADDISON (Parliamentary Secretary to the Ministry of Munitions) replied: A strong committee was appointed a short time since by the Ministry, after consultation with the Home Secretary, to examine the problems arising out of T.N.T. poisoning, both from the mechanical and medical points of view,

and to make recommendations to the Ministry. Much useful work has already been done by the Committee, and the recommendations so far made have been adopted by the Ministry and are being put into effect. The noble lord will recognise that many of the problems which arise are entirely new and in some cases difficult of scientific investigation. He may rest assured that such steps as may be found to be necessary will be taken without hesitation.

Scurvy in Mesopotamia.

Answering Sir JOHN JARDINE, Mr. FORSTER said that so far as he knew the supply of vegetables to the troops was as abundant as could be made.

Sir JOHN JARDINE: And lime-juice, too, as a protection against scurvy?—Mr. FORSTER: Yes, sir, every possible precaution will be taken.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

BELL, CHARLES EDWARD WALLACE, M.R.C.S., L.R.C.P., L.M. Edin., has been appointed Honorary Consulting Surgeon to the Royal Devon and Exeter Hospital.

BRAITHWAITE, R. W., M.D. St. And., a Medical Commissioner of the Board of Control for Lunatics and Mental Defectives.

BRODRICK, CHARLES CUMBERLAND, L.R.C.P., L.R.C.S., L.M. Edin., Medical Officer of Health for the Tavistock (Devon) Rural District.

COOKE, E. M., M.B. Lond., Acting Chairman of the Board of Control for Lunatics and Mental Defectives.

GARDNER, F. G., M.R.C.S., L.S.A., Captain, R.A.M.C. (T.F.), Clinical Assistant in the Ear and Throat Department, Radcliffe Infirmary, Oxford.

GOOD, ARNOLD SAXTY, L.R.C.P., M.R.C.S., Public Vaccinator by the Great Torrington (Devon) Board of Guardians.

O'CONNOR, BRIDGET I., Assistant Medical Officer of Health for the Borough Maternity and Child-Welfare Scheme at Plymouth.

OSMOND, CHARLES HOLDWAY, L.R.F.P.S. Glasg., L.S.A., Public Vaccinator for Hayle (Cornwall).

PRIDHAM, FREDERICK CHARLES, L.R.C.P., M.R.C.S., Medical Officer for the Great Torrington District and Workhouse by the Great Torrington (Devon) Board of Guardians.

SINCLAIR, G., M.D. Durh., Medical Referee under the Workmen's Compensation Act, 1906, for the Sheriffdom of Caithness, Orkney, and Shetland.

SYQUIA, R. R., M.R.C.S., L.R.C.P., House Surgeon to the Ear, Nose, and Throat Hospital, Great Portland-street.

Certifying Surgeons under the Factory and Workshops Acts: BLAIR, J., M.D., M.S. Q.U.I. (St. Annes-on-the-Sea, Lancs.); and ROBINSON, H. J., M.B., B.C. Cantab. (Kirkoswald, Cumberland).

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).
When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.

BARROW-IN-FURNESS, NORTH LONSDALE HOSPITAL.—House Surgeon. Salary £250 per annum, with board, &c.

BIRMINGHAM CITY, YARDLEY ROAD SANATORIUM AND TUBERCULOSIS DISPENSARY, Broad-street. Assistant Medical Officer. Salary £300 per annum, with board, &c.

BRISTOL ROYAL INFIRMARY.—House Physician. Salary at rate of £120 per annum, with board, &c.

CARDIFF, KING EDWARD VII.'s HOSPITAL.—Medical Officers and Pathologist.

CHESTER ROYAL INFIRMARY.—House Surgeon and House Physician. Salary £180 and £160 respectively, with board, &c.

DARLINGTON HOSPITAL AND DISPENSARY.—House Surgeon. Salary £200 per annum, with board, &c.

DARTMOOR SANATORIUM, Chagford, Devon.—Medical Assistant.

DERBYSHIRE ROYAL INFIRMARY.—House Physician and Casualty Officer. Salary £200 per annum, with board, &c.

DEVONPORT, ROYAL ALBERT HOSPITAL.—House Surgeon, unmarried. Salary £150 per annum, with board, &c.

FOLKESTONE, ROYAL VICTORIA HOSPITAL.—Resident Medical Officer. Salary £200 per annum, with board, &c.

GLOUCESTER, GLOUCESTERSHIRE ROYAL INFIRMARY AND EYE INSTITUTION.—Surgeon.

LIVERPOOL, HIGHFIELD MILITARY HOSPITAL.—Assistant Resident Medical Officer. Salary £300 per annum, with rations, &c.

MANCHESTER, HULME DISPENSARY, Dale-street, Stretford-road.—House Surgeon. Salary £250 per annum, with apartments, &c.

MANCHESTER ROYAL EYE HOSPITAL.—House Surgeon. Salary £120 per annum, with board, &c.

MANCHESTER, ST. MARY'S HOSPITALS FOR WOMEN AND CHILDREN, High-street.—Resident Surgical Officer. Salary at rate of £150 per annum, with board, &c.

NAVAL AUXILIARY HOSPITAL IN SCOTLAND.—Anæsthetist and Assistant Medical Officer. Salary £1 per day, residence, &c.

NORTHERN HOSPITAL, Winchmore hill, N.—Resident Assistant Medical Officer for the Tuberculosis Wards. Salary 7 guineas per week.

PADDINGTON GREEN CHILDREN'S HOSPITAL, London, W.—Temporary Pathologist. Salary £125 per annum, with lunch.

PRESTON, LANCS, COUNTY ASYLUM, Whittingham.—Locum Tenens, unmarried. Salary £7 7s. per week, with board, &c.

QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, Bethnal Green, E.—Clinical Assistants for Medical Out-patient Work for six months.

ROTHERHAM HOSPITAL.—Junior House Surgeon. Salary £150 per annum, with board, &c.

ROYAL LONDON OPHTHALMIC HOSPITAL, City-road, E.C.—Third House Surgeon. Salary at rate of £50 per annum, with board, &c.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, 234, Great Portland-street, W.—Resident Surgical Officer.

SALISBURY GENERAL INFIRMARY.—House Surgeon, unmarried. Salary £150 per annum, with board, &c.

VENTNOR, ISLE OF WIGHT, ROYAL NATIONAL HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST ON THE SEPARATE PRINCIPLE.—Assistant Resident Medical Officer.

VICTORIA HOSPITAL FOR CHILDREN, Tite-street, Chelsea, S.W.—Dental Surgeon.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Ballyhaise, Cavan; City of London; Ringwood, Hants; and Hathersage, Derby.

Births, Marriages, and Deaths.

BIRTHS.

CRAWSHAW.—On Nov. 5th, at Croft House, Glenridding-on-Ullswater, the wife of Ernest John Crawshaw, M.R.C.S., L.R.C.P., of a daughter.

HERDMAN NEWTON.—On Nov. 8th, at Eglinton-crescent, Edinburgh, the wife of Captain Charles Herdman Newton, R.A.M.C., of a son.

SKINNER.—On Nov. 5th, to Dr. and Mrs. A. H. Skinner, Hankow, China—a daughter.

WILLIAMS.—On Nov. 12th, at Alton, Hants, the wife of H. Currer Williams, M.B., of a son.

MARRIAGES.

CHECCHI—WILSON.—On Sept. 19th, at St. John's Presbyterian Church, Elsternwick, Melbourne, Captain Cyril Checchi, A.A.M.C. (late R.A.M.C.), to Fanny Suddaby, only daughter of Mr. and Mrs. George Wilson, of the Ceylon and India General Mission, Anthiyur, South India.

DYER—LEE.—On Nov. 7th, at All Saints, Woodton, Norfolk, Surgeon C. Geary Dyer, R.N., and Alice Philippa Driffield Lee, elder daughter of the Rev. F. and Mrs. Lee, of Woodton Rectory, Bungay, Norfolk.

VIVIAN—THOMPSON.—On Nov. 9th, at St. Paul's Church, Winchmore-hill, N., Charles St. Aubyn Vivian, Temporary Captain, R.A.M.C., to Mary Elizabeth, daughter of the late Rev. J. M. Thompson and of Mrs. Thompson, Hornsey, N.

WHYTE—GREHAN.—On Nov. 6th, at the Parish Church, Banteer, Captain George Whyte, R.A.M.C., to Magda, second daughter of Stephen Grehan, D.L., of Clonmeen, Co. Cork.

DEATHS.

MATHEWSON.—Died of wounds, on Oct. 27th, Captain Hamilton Mathewson, R.A.M.C., attached Northamptons, aged 34.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

BOOKS, ETC., RECEIVED.

BADGER, RICHARD G., Boston.
Causation and Treatment of Psychopathic Diseases. By Boris Sidis, A.M., Ph.D., M.D. Price $2.50.

DENT, J. M., AND SONS, London, Paris, and Toronto.
Infancy and Childhood: A Popular Book on the Care of Children. By W. R. Ramsey, M.D., Assist. Prof. of Diseases of Children, University of Minnesota. Price 3s. 6d. net.

FALCONER, JOHN, Dublin.
Transactions of the Royal Academy of Medicine in Ireland. Vol. XXXIV. Edited by J. A. Scott, M.A., M.D., F.R.C.S.I.

LAURIE, T. WERNER, London.
A Mechanistic View of War and Peace. By G. W. Crile. Edited by Amy F. Rowland. Price 6s. net.

MACMILLAN COMPANY, THE, New York.
Sex Education: A Series of Lectures Concerning Knowledge of Sex in Its Relation to Human Life. By Maurice Bigelow, Professor of Biology, Vacher's College, Columbia University. Price 5s. 6d. net.

NISBET AND CO., LTD., London.
Eclipse or Empire? By H. B. Gray, D.D. Oxon., and Samuel Turner. Price 2s. net.

PATHOLOGICAL SOCIETY OF PHILADELPHIA.
Proceedings, Jan. 1915–Jan. 1916. Edited by J. A. Kolmer, M.D.

PUTNAM'S SONS, G. P., London and New York.
Text-book of Materia Medica for Nurses. Compiled by Lavina L. Dock, R.N., New York State. Fourth edition.

SCIENTIFIC PRESS, London.
The Midwife's Pronouncing Dictionary of Obstetrical and Gynæcological Terms. Edited by Henry Robinson, M.A., M.D. New and revised edition. Price 1s. net.

SURGERY PUBLISHING CO., 92, William-street, New York City.
American Year-book of Anæsthesia and Analgesia. By F. H. McMechan, A.M., M.D. Price $4.00.

TAYLOR AND FRANCIS, Red Lion-court, London.
Calendar of the Royal College of Surgeons of England, 1916.

WILLIAMS AND NORGATE, London.
A Spiritual Pilgrimage. By the Rev. R. J. Campbell. Price 7s. 6d. net.

YEAR-BOOK PUBLISHERS, Chicago.
Gynecology (Practical Medicine Series, Vol. IV.). Edited by E. C. Dudley, A.M., M.D., and H. M. Stowe, M.D. Price $1.35.

Notes, Short Comments, and Answers to Correspondents.

RISKS OF MEDICAL PRACTICE.

IN two recent trials criminal assaults committed upon medical practitioners when making professional visits to their patients have formed the subject of inquiry. In the one case there was a fatal issue. The surgeon was summoned by telegram to attend a farmer near Llansawel, in Wales, and as he entered the farm premises was fired upon with a shot-gun and wounded by the patient's son. A struggle followed, but the medical man was overmastered and killed by blows on the head. His assailant took refuge in the mountains, where he was arrested by the police after five days' search. A verdict of "Guilty but insane" was returned, and no doubt rightly, but it is a regrettable circumstance that symptoms of mental derangement that the prisoner had clearly shown before his final outbreak had not received more attention. His mother deposed that he sometimes took a gun up to a bedroom with the declared object of preventing people from entering the house to poison his father and mother, and he had a few days before threatened with his gun another medical practitioner who had been asked to attend his father. The other case referred to was that of an elderly workman at Glasgow, who violently assaulted a practitioner trying to find the house to which he had been summoned late on a Saturday night. When the doctor knocked at the door the prisoner came out of an adjoining dwelling and attacked him. He afterwards stated that he was a widower with daughters, and thought that the medical man was a person visiting the place for an immoral purpose. The Sheriff, however, does not appear to have attached much weight to this story of a mistake, for he imposed a sentence of six weeks' imprisonment with hard labour. These two instances illustrate the danger sometimes incurred by medical men, who, in the ordinary exercise of their profession, are constantly obliged to visit patients in surroundings unknown to them, and where the patient's neighbours may resent the intrusion of a stranger whose clothes proclaim him to be of a different social class from themselves. Assaults on medical men when engaged on their work are, on the whole, very infrequent.

THE PROBLEM OF THE WAR CRIPPLE.

COMMENTING on the necessity for the coöperation of technical institutions, emphasised by the Director-General of the Army Medical Service, Sir Alfred Keogh, at a recent meeting, a correspondent with a special knowledge of the re-education of disabled men suggests that something might be done by founding scholarships at institutions such as the Manchester School of Technology, in order to train officers and men of previous good education to take positions of responsibility in the chemical, textile, printing, and probably other industries. The Lord Kitchener Memorial Fund might, he thinks, be made available for this purpose.

THE PERIL OF BELGIAN CHILDREN.

Sir Charles Wakefield, who has just ceased to be Lord Mayor of London, is chairman of the British National Committee for Relief in Belgium, and has issued an urgent appeal on behalf of the 2,575,000 children held captive by the Germans in Belgium, the majority of whom have for over two years been kept alive by the humane intervention of the Neutral Commission for Relief in Belgium, of which Mr. Hoover is secretary. We may realise something of Belgium's plight when we are told that hunger, suffering, and sickness have fallen upon mother and child, that tuberculosis sanatoria are overcrowded and the waiting lists are increasing, and that rickets among younger children is becoming epidemic, but it is more difficult to picture the actual number of suffering children. It would take considerably more than two calendar months, working at the rate of 12 hours a day, including Sundays, for one man to count the number, supposing him to do so at the rate of one per second. The appeal is accompanied by the proposal that on every British dinner-table on this coming Christmas Day there shall be an "Envelope of Mercy," into which every one present may put what he or she can spare, whether pennies, shillings, or pounds. 10,000 volunteer women workers are required in London alone for the distribution of the envelopes, which can be obtained from the National Committee at Trafalgar Buildings, Trafalgar-square, or from its branches throughout the Empire. A message from the Archbishop of Canterbury, Cardinal Bourne, the Moderator of the Church of Scotland, and the President of the Free Church Council emphasises the extremity of Belgium's present distress and the dire need of further aid, especially the provision of food for little children.

"REPEAT" PRESCRIPTIONS.

FROM Nov. 1st until three months after the "conclusion of peace" "repeat" prescriptions will be recognised in panel practice in London subject to conditions framed with a view to preventing inconvenience and risk to insured persons. The conditions, it will be remembered, were originally set out in a letter addressed to the London Insurance Committee by the Commissioners, the former having been prepared to forbid the use of repeat prescriptions altogether. The conditions are to the effect that a "repeat" prescription must refer to an original prescription given during the same calendar month as the "repeat" prescription, and the reference must be to an order containing only one prescription, so that confusion may be avoided. For like reasons, the "repeat" must not modify the original in any respect, and no additional prescription may accompany it on the same order. A prescription must be given in full if the patient so requests. The "repeat" order must indicate clearly the date of the order for the prescription which is to be repeated. The above may be taken to indicate the policy of the Insurance Commissioners with regard to the use of the form "rep. mist." Its use is to be discouraged, but subject to conditions which will in any case prevent it from being used without consideration it may be employed during the present period of exceptional difficulty and stress for medical practitioners. It is, in short, to be treated as a labour-saving device justified to a modified extent by circumstances.

THE INFECTIOUSNESS (?) OF LUPUS.

THE medical officer of a private boarding school asks whether a boy who arrived at the school with an old healed tuberculous hip, scars of healed lupus on the body, and a patch of active, but not ulcerated, lupus on his face, should in the interest of the other pupils be received as a boarder. The opinion of recognised authorities on school hygiene is that the medical officer is not called upon to advise the removal of the boy from school on account of any danger of infection to the other pupils. It might, however, be desirable for æsthetic reasons, or because of misgivings on the part of pupils and their parents, to take the opposite course, and the reputation of the school has to be considered. It is probably the medical officer's duty to make this clear to the school authorities and to leave the onus of decision with them. In the present state of our knowledge there is no evidence whatever that a patch of lupus in process of being absorbed is of the slightest risk by contact to school fellows.

ALIEN ENEMIES RELIEF.

THE fourth report of the Emergency Committee for the assistance of Germans, Austrians, and Hungarians in distress, dealing with the year ending June, 1916, is a praiseworthy record of work done in connexion with repatriation, the visitation and employment of men in internment camps, and the care of women and children left behind, most of whom are of British birth. Since August, 1915, 289 children have been sent to the committee's convalescent home at Willesden or to the country for convalescence or holidays. The receipts for the year were £19,760 and the balance £4553. Donations should be sent to the honorary treasurer, Mr. W. Hanbury Aggs, 169, St. Stephen's House, Westminster Bridge, S.W.

FOR DARK NIGHTS.

IN the early days of the war we made a suggestion, which was published in our issue of Oct. 17th, 1914, that with the serious restrictions placed upon our public lighting services the kerbing of the pavement in busy thoroughfares, or at congested crossings, should be brought into bold outline by a coat of whitewash. The suggestion was ignored for some time, but now it has been very generally adopted, much to the pedestrian's convenience and safety. Now that the lighting arrangements are yet more restricted it is well worth considering whether all occupiers of premises should not be compelled to keep the kerbing in front of their premises regularly whitewashed. This would not be a very great hardship on the householder or shopkeeper, while it would confer a real benefit on the community in the dark days now rapidly approaching us. In the fog which suddenly enveloped the metropolis on Monday night last it was impossible to see where the pavement ceased and where the road boundary began. Considering the very great help which such a little thing would give, we may inquire why in everybody's interest such a precaution against the dangers of darkness should not be insisted upon. It does not appear possible for the local authorities to undertake the work, but it could easily enough be done by individuals willing, as all must be, to reduce the discomforts occasioned by the cutting off of public lighting.

COMMUNICATIONS not noticed in our present issue will receive attention in our next.

Medical Diary for the ensuing Week.

SOCIETIES.

ROYAL SOCIETY, Burlington House, London, W.

THURSDAY.—Papers:—Dr. T. J. I'a Bromwich: The Scattering of Plane Electric Waves by Spheres.—Mr. J. Proudman, Mr. A. T. Doodson, and Mr. G. Kennedy: Numerical Results of the Theory of the Diffraction of a Plane Electro-magnetic Wave by a Perfectly Conducting Sphere (communicated by Dr. T. J. I'a Bromwich).—And other papers.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Tuesday, Nov. 21st.

GENERAL MEETING OF FELLOWS: at 5 P.M.
Ballot for the Election to the Fellowship.
(Names have already been circulated.)

Thursday, Nov. 23rd.

NEUROLOGY (Hon. Secretaries—H. Campbell Thomson, C. M. Hinds Howell): at 8 P.M.
Clinical Evening.
Anyone desiring to show cases is requested to communicate with the Hon. Secretary, Dr. Hinds Howell, 145, Harley-street, W.

Friday, Nov. 24th.

STUDY OF DISEASE IN CHILDREN (Hon. Secretaries—A. S. Blundell Bankart, E. A. Cockayne): at 4.30 P.M.
Cases:
Dr. Leonard Guthrie: (1) Family Splenomegalic Jaundice; (2) Ascites of Obscure Origin in a Sister of above Patient.
Dr. J. Hugh Thursfield: Case of Skin Disease for Diagnosis.
Dr. F. Langmead: Case of Infantilism.
Dr. Edith Bronson (for Dr. G. A. Sutherland): Case of Myositis.
Dr. E. A. Cockayne: Hereditary Neurofibromatosis (von Recklinghausen's Disease).
Short Paper:
Dr. E. W. Scripture: Inscriptions of Speech in Cerebral Diplegia, with Indications of a New Method of Treatment.

EPIDEMIOLOGY AND STATE MEDICINE (Hon. Secretaries—William Butler, Major Greenwood, jun.): at 8.30 P.M.
Papers:
Dr. W. H. Hamer: Epidemiology of Cerebro-spinal Fever.
Capt. M. Greenwood: The Outbreak of Cerebro-spinal Fever at Salisbury in 1914–1915.

LONDON DERMATOLOGICAL SOCIETY, St. John's Hospital, 49, Leicester-square, W.C.
TUESDAY.—4.30 P.M., Cases sent for Consultation. Demonstration of Pathological Specimens. Exhibition of Clinical Cases. 5 P.M., Paper:—Dr. J. L. Bunch: Salvarsan and its Substitutes.

HUNTERIAN SOCIETY, at the Royal Society of Medicine, 1, Wimpole-street, W.
WEDNESDAY.—8.30 P.M., Council Meeting. 9 P.M., Paper:—Dr. O. May: The Medical Profession and the Campaign against Venereal Disease.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.
Course of Lectures on the Anatomy of the Human Body, for First-aid and Ambulance Students:—
MONDAY.—5 P.M., Lecture IX.:—Prof. A. Keith: The Structures concerned in the Spread of Infections.
WEDNESDAY.—5 P.M., Lecture X.:—Prof. A. Keith: The Anatomy of the Ear and Skull.
FRIDAY.—5 P.M., Lecture XI.:—Prof. A. Keith: The More Common Accidents to the Eye and Ear.
Anatomical Preparations and Specimens used for illustration will be on exhibition in the Theatre from 3 P.M. to 5 P.M. on each lecture day, and between 10 A.M. and 5 P.M. in the Hall of the Museum on the following day.

POST GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.
MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.
TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.
WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations. Dr. Simson: Diseases of Women.
THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.
FRIDAY.—10 A.M., Dr. Simson: Gynæcological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.
SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.
MONDAY.—Clinics:—10.30 A.M., Surgical Out-patients (Mr. E. Gillespie). 2.30 P.M., Medical Out-patients (Dr. T. R. Whipham): Gynæcological Out-patients (Dr. Banister). 3 P.M., Medical In-patients (Dr. R. M. Leslie).
TUESDAY.—2.30 P.M., Surgical Operations (Mr. Carson). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. Howell Evans); Nose, Throat, and Ear Out-patients (Mr. C. H. Hayton). Radiography (Dr. Metcalfe). 3.30 P.M., Medical In-patients (Dr. A. J. Whiting).
WEDNESDAY.—Clinics:—2.30 P.M., Throat Operations (Mr. C. H. Hayton). Children Out-patients (Dr. T. R. Whipham); Eye Out-patients (Mr. R. P. Brooks); Skin Out-patients (Dr. H. W. Barber). 5.30 P.M., Eye Operations (Mr. R. P. Brooks). 3.30 P.M. Special Demonstration:—Dr. T. R. Whipham: Selected Cases of Children's Disease.
THURSDAY.—2.30 P.M., Gynæcological Operations (Dr. A. E. Giles). Clinics:—Medical Out-patients (Dr. A. J. Whiting); Surgical Out-patients (Mr. Carson); Radiography (Dr. Metcalfe). 3 P.M., Medical In-patients (Dr. R. M. Leslie).
FRIDAY.—2.30 P.M., Surgical Operations (Mr. Howell Evans). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. E. Gillespie); Eye Out-patients (Mr. R. P. Brooks).

MEDICO-PSYCHOLOGICAL ASSOCIATION OF GREAT BRITAIN AND IRELAND, 11, Chandos-street, Cavendish-square, W.
TUESDAY.—11 A.M., Educational Committee. 11.45 A.M., Parliamentary Committee. 12.15 P.M., Colonial Branches Committee. 1.45 P.M., Council Meeting. 2.45 P.M., General Meeting. Paper:—Capt. C. McDowall, R.A.M.C.: Functional Gastric Disturbance in the Soldier.

LONDON HOSPITAL, Mile End-road, E.
THURSDAY.—11 A.M., Dr. J. H. Sequeira: Early Diagnosis and Treatment of Syphilis. (Lecture I.) In connexion with this lecture Dr. J. McIntosh will give a Practical Demonstration of the Examination for Spirochætes and Wassermann Test.

ST JOHN'S HOSPITAL FOR DISEASES OF THE SKIN, 49, Leicester-square, W.C.
TUESDAY.—4 P.M., Dr. J. L. Bunch: Itching Skin Diseases and their Treatment.
THURSDAY.—6 P.M., Chesterfield Lecture:—Dr. M. Dockrell: The Treatment of Eczema.

THE THROAT HOSPITAL, Golden-square, W.
MONDAY.—5.15 P.M., Special Demonstration of Selected Cases.
THURSDAY.—5.15 P.M., Clinical Lecture.

CHADWICK PUBLIC LECTURES.
MONDAY (at Hampstead Central Library, Finchley-road, N.W.).—5 P.M., Dr. J. T. C. Nash: Baby-saving for the Nation (illustrated with lantern slides).

INSTITUTE OF HYGIENE, 33-34, Devonshire-street (Harley-street), W.
TUESDAY.—4 P.M., Lecture:—Mr. E. R. T. Clarkson: The Problem of Gonorrhœa.

METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, Nov. 15th, 1916.

Date.	Barometer reduced to Sea Level and 32° F.	Direction of Wind.	Rainfall.	Solar Radiation in Vacuo.	Maximum Temp. in Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks.
Nov. 9	29·730	W.	...	77	52	41	41	42	Fine
,, 10	30·240	W.	...	65	55	42	44	45	Cloudy
,, 11	30·350	W.	...	67	58	45	54	55	Overcast
,, 12	30·340	W.	...	61	58	48	53	53	Overcast
,, 13	30·310	S.W.	...	63	53	44	45	45	Foggy
,, 14	30·360	S.E.	...	56	52	45	51	51	Foggy
,, 15	30·398	N.E.	...	73	49	45	44	45	Foggy

The following journals, magazines, &c., have been received:—Edinburgh Medical Journal, Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris, Journal of Laryngology, Rhinology and Otology, Revue d'Hygiène et de Police Sanitaire, Archives de Médecine et Pharmacie Navales, British Journal of Children's Diseases, Maryland Medical Journal, American Journal of Roentgenology, La Clinique Ophtalmologique, Annales de l'Institut Pasteur, Duodecim.

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